

SAFETY COMPLIANCE TESTING FOR FMVSS No. 218 MOTORCYCLE HELMETS

**Manufacturer: Zhejiang Bio Industry & Trade Co., Ltd.
Model: HY 819
Tested Size: XL (61-62 cm)**

Prepared For:

**Zhejiang Bio Industry & Trade Co., Ltd.
1269 QiuBin District, Jinhua City,
Zhejiang Province,
China 321016**



14 October 2014

Final Report No.: 539.0020.002

Tested By:

**Taicang ACT Sporting Goods Testing Co., Ltd.
No. 35 Zhenghe Road,
Ludu Town, Taicang City, Suzhou,
Jiangsu Province, China 215412
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Contract File No.: 539.0020

Test File: 002

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Control Document Rev. 17 July2013

Technician: Kidman Yu

Test Date: 14 October 2014

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PURPOSE OF COMPLIANCE TEST

Purpose:

The purpose of this test was to determine if the motorcycle helmets supplied by:

Zhejiang Bio Industry & Trade Co., Ltd.

met the requirements of

Federal Motor Vehicle Safety Standard No. 218: Motorcycle Helmets effective May 13, 2013.

All samples received were in good condition and appropriate for these tests.

Test Procedure:

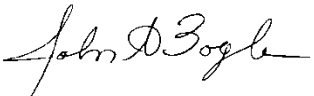
This test was performed following TP-218-07 and ACT Lab Cadex Helmet Testing Manual 2.3.

HELMET DATA

Helmet Brand Name	IV2						
Model Designation	HY 819						
Manufacturer	Zhejiang Bio Industry & Trade Co., Ltd.						
Helmet Size Label	XL (61-62 cm)						
Test Headform size	Small		Medium		Large	X	
Helmet Positioning Index (HPI)	77 mm		Manufacturer supplied	X	ACT determined		
Helmet Coverage	Partial		Full	X	Complete		Modular
Shell Material	ABS Plastic						
Liner Material	EPS						
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	Black	Black	Black	Black	---
Weight (grams)	820	822	820	820	---
Month & Year of Manufacture	9/14	9/14	9/14	9/14	---

Other Standard Label(s) Present?	None	X	Yes, list	
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Reviewed by: **John Bogler** 

COMMENTS:

1. This HY 819 XL helmet met all FMVSS 218 requirements.
2. All helmets were received in undamaged condition and were appropriate for testing.
3. Weights listed above for helmets A-D are as tested with visor removed.

SUMMARY OF TEST RESULTS

INDICATE P - Pass or F - Fail

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

TEST	PASS	FAIL
PERIPHERAL VISION	P	
PROJECTIONS	P	
LABELING	P	

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

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.

Ambient Temperature	Ambient Humidity:
22°C	57%

IMPACT ATTENUATION

Helmet ID	Condition	Impact #	Impact Location	Anvil	Drop Height (cm)	Velocity (m/sec)	Duration at 150G (ms)	Duration at 200G (ms)	Peak Acc. (g)	Pass/Fail
539.0020.002-A	Ambient	1	LF SIDE	FLAT	199.0	5.9322	1.55	0.00	162.1	Pass
539.0020.002-A	Ambient	2	LF SIDE	FLAT	199.0	5.9840	2.30	0.00	176.6	Pass
539.0020.002-A	Ambient	3	REAR	FLAT	199.0	6.1629	1.97	0.00	161.2	Pass
539.0020.002-A	Ambient	4	REAR	FLAT	199.0	6.0422	3.10	0.00	193.0	Pass
539.0020.002-A	Ambient	5	FRONT	HEMI	149.0	5.1993	0.00	0.00	85.4	Pass
539.0020.002-A	Ambient	6	FRONT	HEMI	149.0	5.1990	0.84	0.00	162.6	Pass
539.0020.002-A	Ambient	7	RT SIDE	HEMI	149.0	5.2218	0.00	0.00	92.2	Pass
539.0020.002-A	Ambient	8	RT SIDE	HEMI	149.0	5.2128	0.00	0.00	94.6	Pass
539.0020.002-B	Cold	1	LF SIDE	FLAT	199.0	6.0259	0.00	0.00	122.1	Pass
539.0020.002-B	Cold	2	LF SIDE	FLAT	199.0	6.0596	2.68	0.00	199.8	Pass
539.0020.002-B	Cold	3	REAR	FLAT	199.0	6.0419	0.00	0.00	139.4	Pass
539.0020.002-B	Cold	4	REAR	FLAT	199.0	6.0191	2.57	1.37	247.0	Pass
539.0020.002-B	Cold	5	FRONT	HEMI	149.0	5.2221	0.00	0.00	83.5	Pass
539.0020.002-B	Cold	6	FRONT	HEMI	149.0	5.1976	1.44	0.92	279.8	Pass
539.0020.002-B	Cold	7	RT SIDE	HEMI	149.0	5.2148	0.00	0.00	86.4	Pass
539.0020.002-B	Cold	8	RT SIDE	HEMI	149.0	5.2282	0.00	0.00	94.6	Pass
539.0020.002-C	Hot	1	LF SIDE	FLAT	199.0	6.0240	1.04	0.00	155.4	Pass
539.0020.002-C	Hot	2	LF SIDE	FLAT	199.0	6.0580	2.45	0.00	173.7	Pass
539.0020.002-C	Hot	3	REAR	FLAT	199.0	6.0629	0.00	0.00	149.6	Pass
539.0020.002-C	Hot	4	REAR	FLAT	199.0	6.0271	2.37	0.00	177.1	Pass
539.0020.002-C	Hot	5	FRONT	HEMI	149.0	5.2055	0.00	0.00	83.0	Pass
539.0020.002-C	Hot	6	FRONT	HEMI	149.0	5.2010	1.31	0.85	270.2	Pass
539.0020.002-C	Hot	7	RT SIDE	HEMI	149.0	5.2065	0.00	0.00	86.4	Pass
539.0020.002-C	Hot	8	RT SIDE	HEMI	149.0	5.2055	0.00	0.00	117.7	Pass
539.0020.002-D	Wet	1	LF SIDE	FLAT	199.0	6.0448	1.52	0.00	158.3	Pass
539.0020.002-D	Wet	2	LF SIDE	FLAT	199.0	6.0661	2.45	0.00	175.1	Pass
539.0020.002-D	Wet	3	REAR	FLAT	199.0	6.0825	1.87	0.00	160.2	Pass
539.0020.002-D	Wet	4	REAR	FLAT	199.0	6.0581	3.26	0.00	195.4	Pass
539.0020.002-D	Wet	5	FRONT	HEMI	149.0	5.2175	0.00	0.00	84.4	Pass
539.0020.002-D	Wet	6	FRONT	HEMI	149.0	5.2174	1.41	0.52	211.8	Pass
539.0020.002-D	Wet	7	RT SIDE	HEMI	149.0	5.2306	0.00	0.00	82.5	Pass
539.0020.002-D	Wet	8	RT SIDE	HEMI	149.0	5.2150	0.00	0.00	97.0	Pass

Contract File No.: 539.0020

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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	PASS		AMBIENT
2	A	Right Rear	PASS		AMBIENT
3	B	Crown	PASS		LOW TEMPERATURE
4	B	Right Rear	PASS		LOW TEMPERATURE
5	C	Crown	PASS		HIGH TEMPERATURE
6	C	Right Rear	PASS		HIGH TEMPERATURE
7	D	Crown	PASS		IMMERSED
8	D	Right Rear	PASS		IMMERSED

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	ELONGATION (cm)
A	AMBIENT	1.0
B	LOW TEMPERATURE	1.5
C	HIGH TEMPERATURE	0.9
D	WATER IMMERSED	0.9

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 2.54 cm (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: > 105°
BROW OPENING	> 2.5 cm (1 inch)	Pass: >2.5 cm at 105°

PROJECTIONS

Paragraph S5.5

REQUIREMENTS:

PROJECTION	REQUIREMENT
Internal rigid	None
External rigid	Operational, shall not protrude more than 5 mm

TEST RESULTS:

PROJECTION	PRESENT?	HEIGHT (mm)
Internal	None	Not Applicable
External	Snap Base	4.7 mm

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	Pass/Fail	Permanent
Manufacturer's name or identification	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: 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	Pass/Fail	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.

TEST DATA

Contract File No.: 539.0020

Test File: 002

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Control Document Rev. 17 July 2013

Technician: Kidman Yu

Test Date: 14 October 2014

Uni-Axial Calibration

M.E.P. Pad Model : 1 MEP

Helmet Manufacturer : Bio
Address :

Laboratory Temperature : 22 deg C

Laboratory Humidity : 57 %

Selected Filter Frequency : 1000 Hz

Acc. sensitivity (axis Z) : 10.12 mV/G

Acc. sensitivity (axis X) : 10.33 mV/G

Acc. sensitivity (axis Y) : 10.32 mV/G

Testing Laboratory : Taicang ACT Lab

Address : No.35 Zhenghe Road, Ludu Town,
Taicang City, Suzhou, Jiangsu Province,
China 215412

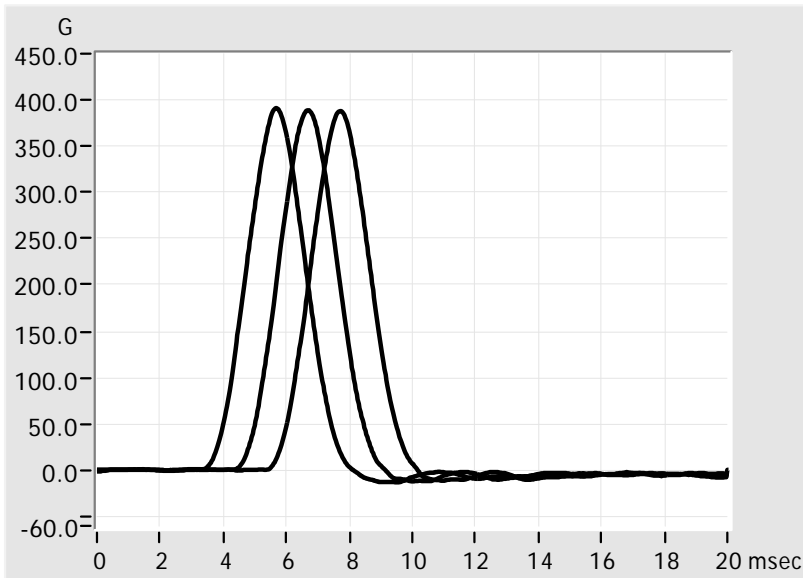
Drop Device : Spherical Impactor (Uni-Axial)

Drop mass assembly : 6.100 kg Time gate flag height : 25.60 mm

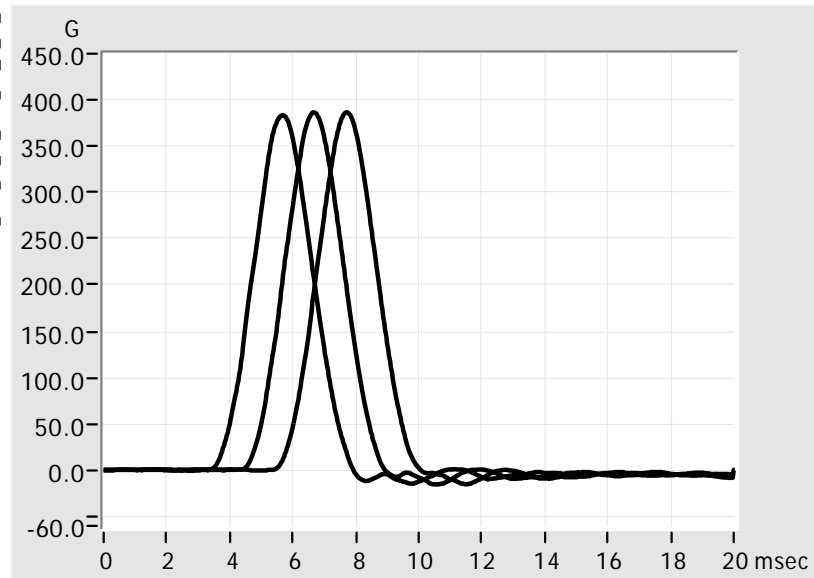
Calibration peak : 400.0 G +/- 20.00 G

Laboratory Technician name : Edward

Pre-Test



Post-Test



	Impact #	Peak Acc.(G)	Velocity IN (m/sec)	Drop Height (cm)	Delta T 150G (msec)	Delta T 200G (msec)	Position	Test Date	Test Time	Friction (%)	PASS or FAIL
Pre-Test	1	390.8	4.5186	110.0	2.43	2.03	0/0	2014-10-14	09:56:27	2.7	Pass
	2	388.4	4.5110	110.0	2.43	2.03	0/0	2014-10-14	09:57:28	2.9	Pass
	3	387.9	4.5179	110.0	2.43	2.03	0/0	2014-10-14	09:58:28	2.7	Pass
Post-Test	1	383.1	4.3602	110.0	2.43	2.03	0/0	2014-10-14	11:09:21	6.1	Pass
	2	386.5	4.3739	110.0	2.42	2.04	0/0	2014-10-14	11:10:21	5.8	Pass
	3	386.5	4.3503	110.0	2.42	2.04	0/0	2014-10-14	11:11:23	6.3	Pass

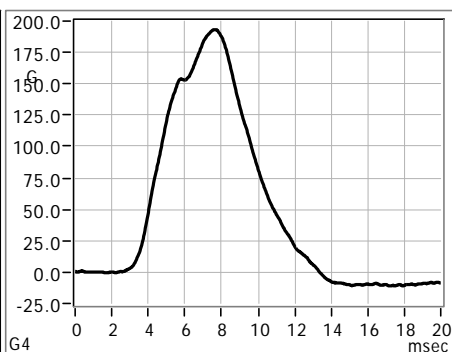
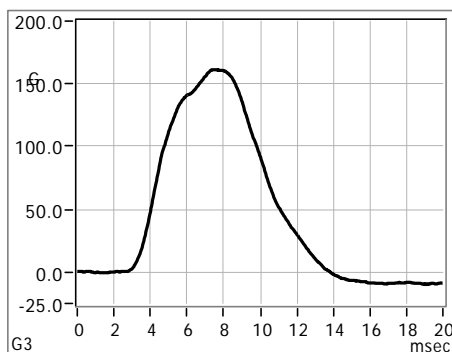
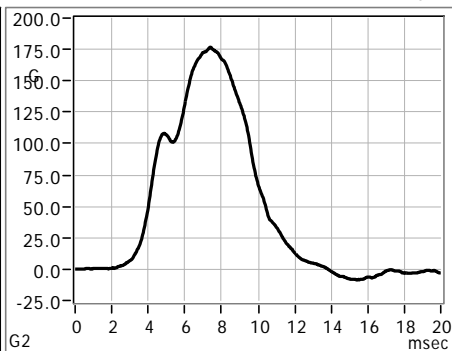
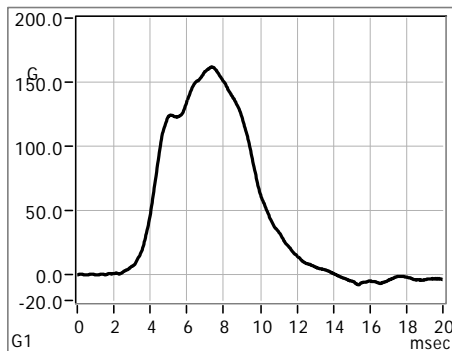
Curve impact #2 : shift of 1ms
Curve impact #3 : shift of 2ms

Impact Uni-Axial

Testing Laboratory : Taicang ACT Lab
 Address : No.35 Zhenghe Road, Ludu Town,
 Taicang City, Suzhou, Jiangsu
 Province, China 215412

Helmet Manufacturer : Bio
 Address :

Laboratory Technician name : Edward
 Batch Number :
 Ref. P.O. Number :



Model : HY 819
 Color : Black
 Size : XL
 Weight : 820.00 g
 Manufacturing Date : 14 Oct 2014
 Standard Request : FMVSS218
 Identification Code : 539.0020.002-A
 Headform Model : D.O.T.
 Headform Size : D D.O.T
 Conditioning : Ambient
 Laboratory Temperature : 22 deg C
 Laboratory Humidity : 57 %
 Selected Filter Frequency : 1650 Hz
 Maximum Peak G's authorized : 400 G
 Maximum Peak m/s² authorized : 3923 m/s²
 Drop mass assembly : 6.100 kg
 Time gate flag height : 25.60 mm
 Acc. sensibility (axis Z) : 10.12

Impact #	Peak Acc. (G)	Velocity IN (m/sec)	Drop Height (cm)	Anvil type	Delta T 150G (msec)	Delta T 200G (msec)	Position	Test Date	Test Time	Friction (%)	PASS or FAIL
1	162.1	5.9322	199.0	FLAT	1.55	0.00	LF SIDE	2014-10-14	10:27:20	5.0	Pass
2	176.6	5.9840	199.0	FLAT	2.30	0.00	LF SIDE	2014-10-14	10:27:35	4.2	Pass
3	161.2	6.1629	199.0	FLAT	1.97	0.00	REAR	2014-10-14	10:34:01	1.4	Pass
4	193.0	6.0422	199.0	FLAT	3.10	0.00	REAR	2014-10-14	10:34:18	3.3	Pass

Impact Uni-Axial

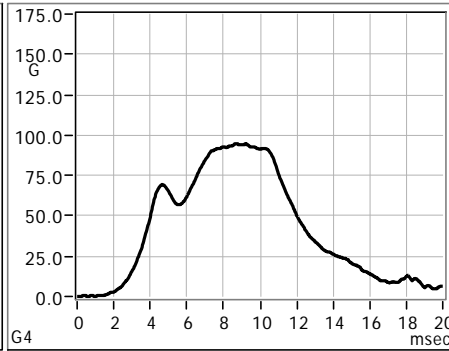
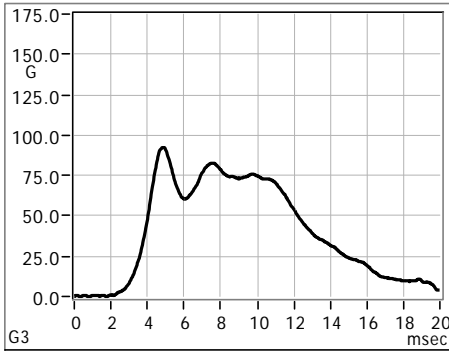
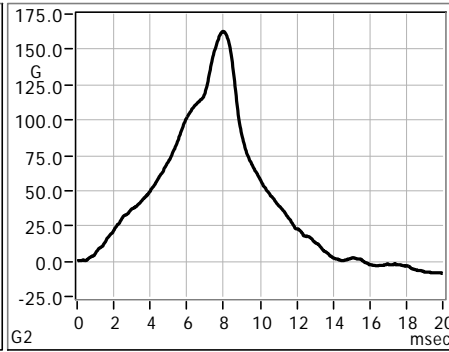
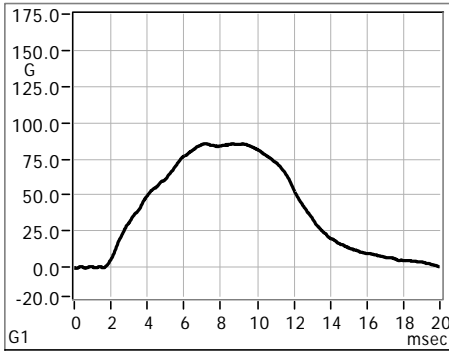
Testing Laboratory : Taicang ACT Lab
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 Taicang City, Suzhou, Jiangsu
 Province, China 215412

Helmet Manufacturer : Bio
 Address :

Laboratory Technician name : Edward

Batch Number :

Ref. P.O. Number :



Model : HY 819
 Color : Black
 Size : XL
 Weight : 820.00 g
 Manufacturing Date : 14 Oct 2014
 Standard Request : FMVSS218
 Identification Code : 539.0020.002-A
 Headform Model : D.O.T.
 Headform Size : D D.O.T
 Conditioning : Ambient
 Laboratory Temperature : 22 deg C
 Laboratory Humidity : 57 %
 Selected Filter Frequency : 1650 Hz
 Maximum Peak G's authorized : 400 G
 Maximum Peak m/s² authorized : 3923 m/s²
 Drop mass assembly : 6.100 kg
 Time gate flag height : 25.60 mm
 Acc. sensibility (axis Z) : 10.12

Impact #	Peak Acc. (G)	Velocity IN (m/sec)	Drop Height (cm)	Anvil type	Delta T 150G (msec)	Delta T 200G (msec)	Position	Test Date	Test Time	Friction (%)	PASS or FAIL
5	85.4	5.1993	149.0	HEMI	0.00	0.00	FRONT	2014-10-14	10:40:29	3.8	Pass
6	162.6	5.1990	149.0	HEMI	0.84	0.00	FRONT	2014-10-14	10:40:44	3.8	Pass
7	92.2	5.2218	149.0	HEMI	0.00	0.00	RT SIDE	2014-10-14	10:49:50	3.4	Pass
8	94.6	5.2128	149.0	HEMI	0.00	0.00	RT SIDE	2014-10-14	10:50:03	3.6	Pass

Impact Uni-Axial

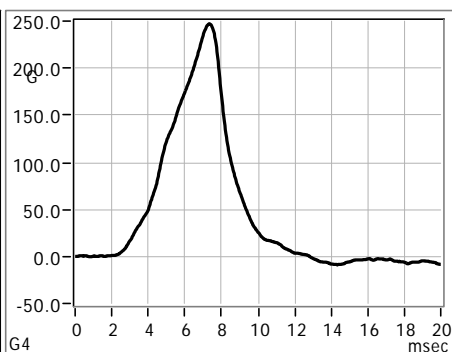
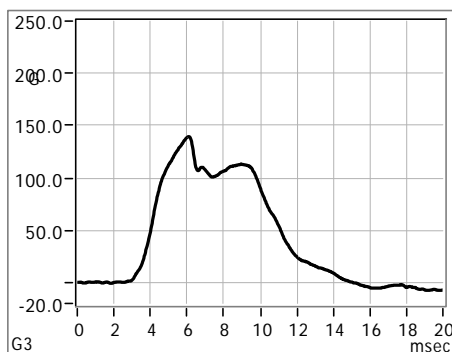
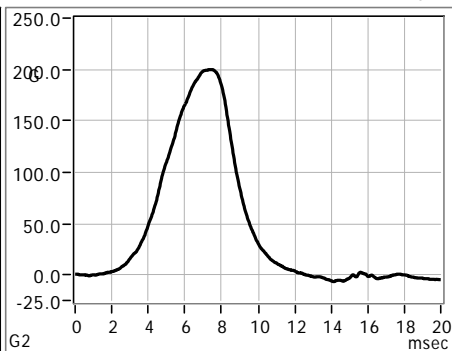
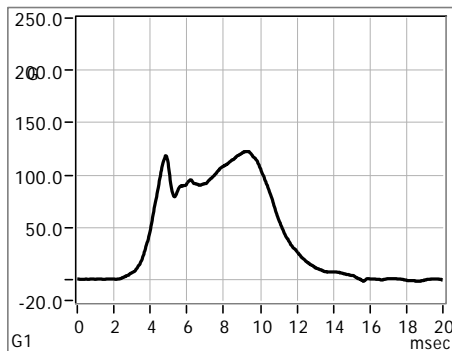
Testing Laboratory : Taicang ACT Lab
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 Province, China 215412

Helmet Manufacturer : Bio
 Address :

Laboratory Technician name : Edward

Batch Number :

Ref. P.O. Number :



Model : HY 819
 Color : Black
 Size : XL
 Weight : 822.00 g
 Manufacturing Date : 14 Oct 2014
 Standard Request : FMVSS218
 Identification Code : 539.0020.002-B
 Headform Model : D.O.T.
 Headform Size : D D.O.T
 Conditioning : Cold
 Laboratory Temperature : 22 deg C
 Laboratory Humidity : 57 %
 Selected Filter Frequency : 1650 Hz
 Maximum Peak G's authorized : 400 G
 Maximum Peak m/s² authorized : 3923 m/s²
 Drop mass assembly : 6.100 kg
 Time gate flag height : 25.60 mm
 Acc. sensibility (axis Z) : 10.12

Impact #	Peak Acc. (G)	Velocity IN (m/sec)	Drop Height (cm)	Anvil type	Delta T 150G (msec)	Delta T 200G (msec)	Position	Test Date	Test Time	Friction (%)	PASS or FAIL
1	122.1	6.0259	199.0	FLAT	0.00	0.00	LF SIDE	2014-10-14	10:28:33	3.5	Pass
2	199.8	6.0596	199.0	FLAT	2.68	0.00	LF SIDE	2014-10-14	10:28:52	3.0	Pass
3	139.4	6.0419	199.0	FLAT	0.00	0.00	REAR	2014-10-14	10:36:27	3.3	Pass
4	247.0	6.0191	199.0	FLAT	2.57	1.37	REAR	2014-10-14	10:36:42	3.7	Pass

Impact Uni-Axial

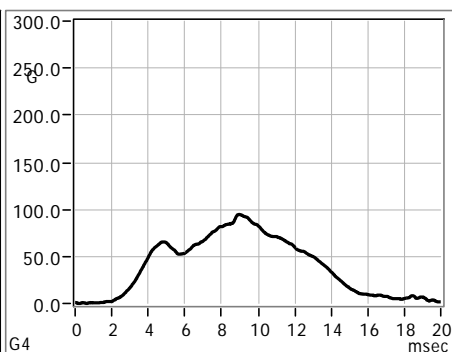
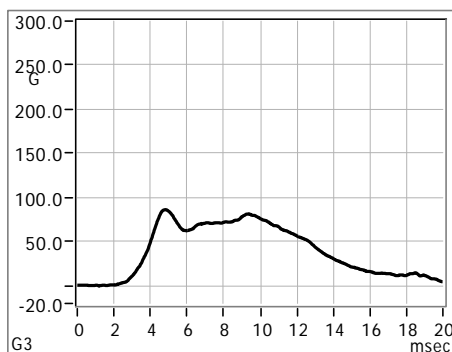
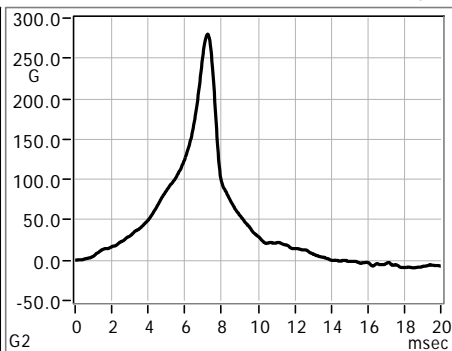
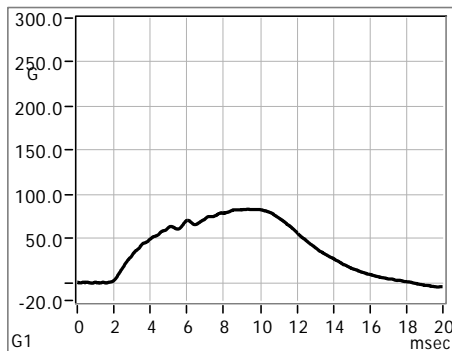
Testing Laboratory : Taicang ACT Lab
 Address : No.35 Zhenghe Road, Ludu Town,
 Taicang City, Suzhou, Jiangsu
 Province, China 215412

Helmet Manufacturer : Bio
 Address :

Laboratory Technician name : Edward

Batch Number :

Ref. P.O. Number :



Model : HY 819
 Color : Black
 Size : XL
 Weight : 822.00 g
 Manufacturing Date : 14 Oct 2014
 Standard Request : FMVSS218
 Identification Code : 539.0020.002-B
 Headform Model : D.O.T.
 Headform Size : D D.O.T
 Conditioning : Cold
 Laboratory Temperature : 22 deg C
 Laboratory Humidity : 57 %
 Selected Filter Frequency : 1650 Hz
 Maximum Peak G's authorized : 400 G
 Maximum Peak m/s² authorized : 3923 m/s²
 Drop mass assembly : 6.100 kg
 Time gate flag height : 25.60 mm
 Acc. sensibility (axis Z) : 10.12

Impact #	Peak Acc. (G)	Velocity IN (m/sec)	Drop Height (cm)	Anvil type	Delta T 150G (msec)	Delta T 200G (msec)	Position	Test Date	Test Time	Friction (%)	PASS or FAIL
5	83.5	5.2221	149.0	HEMI	0.00	0.00	FRONT	2014-10-14	10:44:49	3.4	Pass
6	279.8	5.1976	149.0	HEMI	1.44	0.92	FRONT	2014-10-14	10:45:12	3.9	Pass
7	86.4	5.2148	149.0	HEMI	0.00	0.00	RT SIDE	2014-10-14	10:52:34	3.5	Pass
8	94.6	5.2282	149.0	HEMI	0.00	0.00	RT SIDE	2014-10-14	10:53:14	3.3	Pass

Impact Uni-Axial

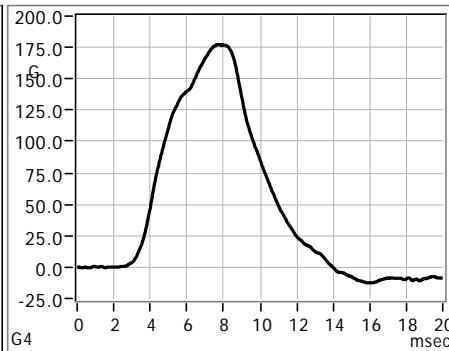
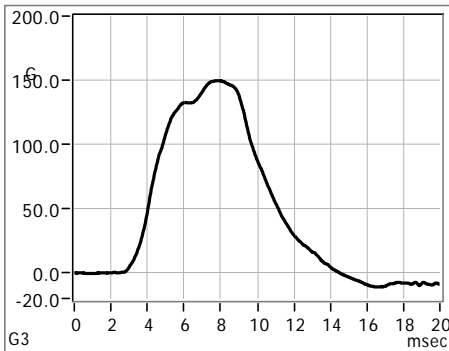
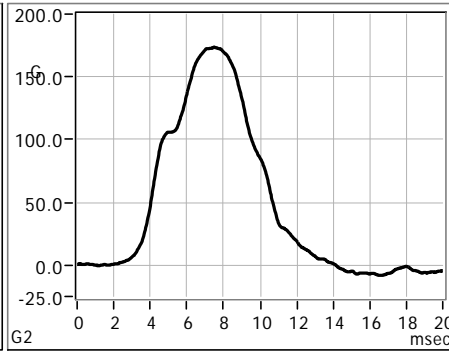
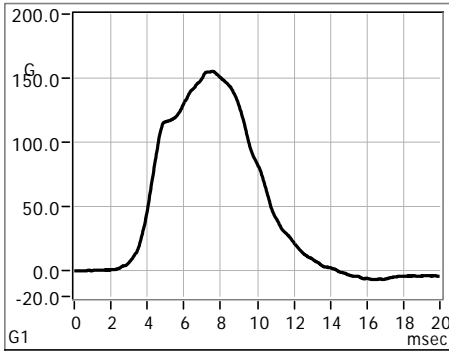
Testing Laboratory : Taicang ACT Lab
 Address : No.35 Zhenghe Road, Ludu Town,
 Taicang City, Suzhou, Jiangsu
 Province, China 215412

Helmet Manufacturer : Bio
 Address :

Laboratory Technician name : Edward

Batch Number :

Ref. P.O. Number :



Model : HY 819
 Color : Black
 Size : XL
 Weight : 820.00 g
 Manufacturing Date : 14 Oct 2014
 Standard Request : FMVSS218
 Identification Code : 539.0020.002-C
 Headform Model : D.O.T.
 Headform Size : D D.O.T
 Conditioning : Hot
 Laboratory Temperature : 22 deg C
 Laboratory Humidity : 57 %
 Selected Filter Frequency : 1650 Hz
 Maximum Peak G's authorized : 400 G
 Maximum Peak m/s² authorized : 3923 m/s²
 Drop mass assembly : 6.100 kg
 Time gate flag height : 25.60 mm
 Acc. sensibility (axis Z) : 10.12

Impact #	Peak Acc. (G)	Velocity IN (m/sec)	Drop Height (cm)	Anvil type	Delta T 150G (msec)	Delta T 200G (msec)	Position	Test Date	Test Time	Friction (%)	PASS or FAIL
1	155.4	6.0240	199.0	FLAT	1.04	0.00	LF SIDE	2014-10-14	10:30:00	3.6	Pass
2	173.7	6.0580	199.0	FLAT	2.45	0.00	LF SIDE	2014-10-14	10:30:13	3.0	Pass
3	149.6	6.0629	199.0	FLAT	0.00	0.00	REAR	2014-10-14	10:37:31	3.0	Pass
4	177.1	6.0271	199.0	FLAT	2.37	0.00	REAR	2014-10-14	10:37:45	3.5	Pass

Impact Uni-Axial

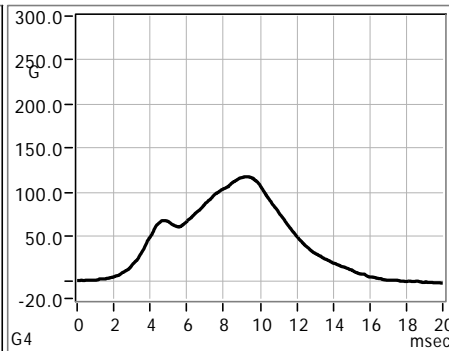
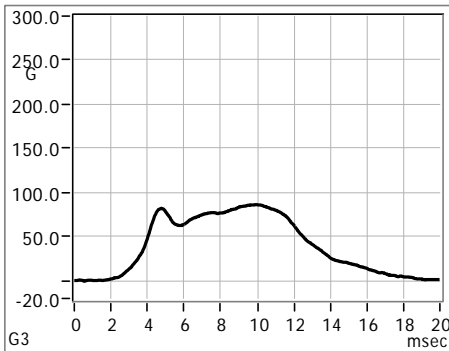
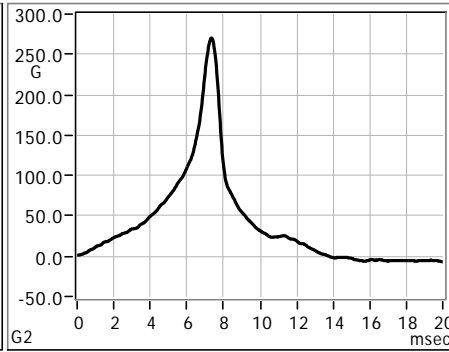
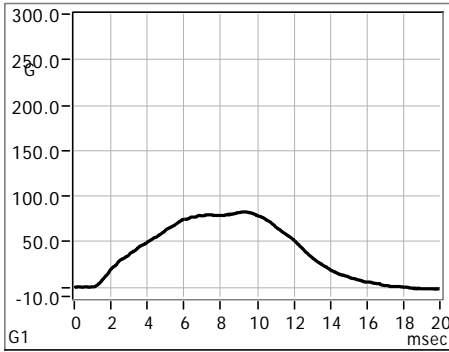
Testing Laboratory : Taicang ACT Lab
 Address : No.35 Zhenghe Road, Ludu Town,
 Taicang City, Suzhou, Jiangsu
 Province, China 215412

Helmet Manufacturer : Bio
 Address :

Laboratory Technician name : Edward

Batch Number :

Ref. P.O. Number :



Model : HY 819
 Color : Black
 Size : XL
 Weight : 820.00 g
 Manufacturing Date : 14 Oct 2014
 Standard Request : FMVSS218
 Identification Code : 539.0020.002-C
 Headform Model : D.O.T.
 Headform Size : D D.O.T
 Conditioning : Hot
 Laboratory Temperature : 22 deg C
 Laboratory Humidity : 57 %
 Selected Filter Frequency : 1650 Hz
 Maximum Peak G's authorized : 400 G
 Maximum Peak m/s² authorized : 3923 m/s²
 Drop mass assembly : 6.100 kg
 Time gate flag height : 25.60 mm
 Acc. sensibility (axis Z) : 10.12

Impact #	Peak Acc. (G)	Velocity IN (m/sec)	Drop Height (cm)	Anvil type	Delta T 150G (msec)	Delta T 200G (msec)	Position	Test Date	Test Time	Friction (%)	PASS or FAIL
5	83.0	5.2055	149.0	HEMI	0.00	0.00	FRONT	2014-10-14	10:46:17	3.7	Pass
6	270.2	5.2010	149.0	HEMI	1.31	0.85	FRONT	2014-10-14	10:46:32	3.8	Pass
7	86.4	5.2065	149.0	HEMI	0.00	0.00	RT SIDE	2014-10-14	10:54:27	3.7	Pass
8	117.7	5.2055	149.0	HEMI	0.00	0.00	RT SIDE	2014-10-14	10:54:40	3.7	Pass

Impact Uni-Axial

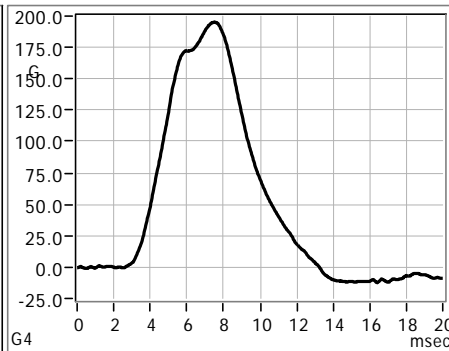
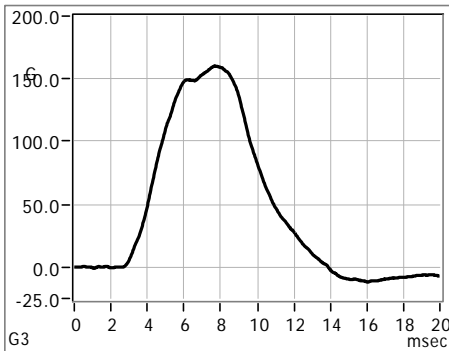
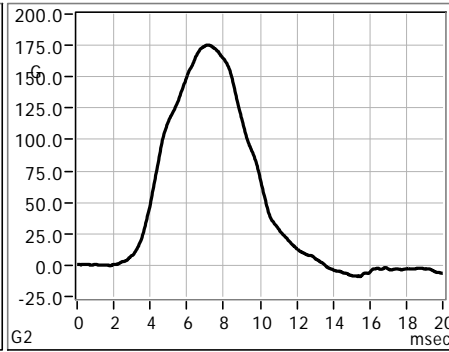
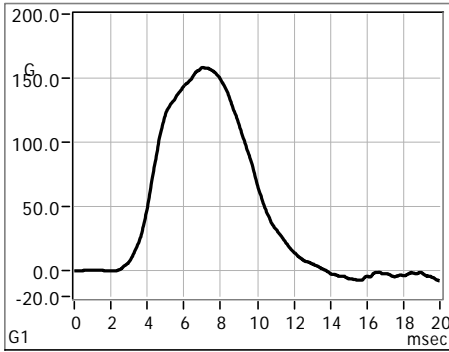
Testing Laboratory : Taicang ACT Lab
 Address : No.35 Zhenghe Road, Ludu Town,
 Taicang City, Suzhou, Jiangsu
 Province, China 215412

Helmet Manufacturer : Bio
 Address :

Laboratory Technician name : Edward

Batch Number :

Ref. P.O. Number :



Model : HY 819
 Color : Black
 Size : XL
 Weight : 820.00 g
 Manufacturing Date : 14 Oct 2014
 Standard Request : FMVSS218
 Identification Code : 539.0020.002-D
 Headform Model : D.O.T.
 Headform Size : D D.O.T
 Conditioning : Wet
 Laboratory Temperature : 22 deg C
 Laboratory Humidity : 57 %
 Selected Filter Frequency : 1650 Hz
 Maximum Peak G's authorized : 400 G
 Maximum Peak m/s² authorized : 3923 m/s²
 Drop mass assembly : 6.100 kg
 Time gate flag height : 25.60 mm
 Acc. sensibility (axis Z) : 10.12

Impact #	Peak Acc. (G)	Velocity IN (m/sec)	Drop Height (cm)	Anvil type	Delta T 150G (msec)	Delta T 200G (msec)	Position	Test Date	Test Time	Friction (%)	PASS or FAIL
1	158.3	6.0448	199.0	FLAT	1.52	0.00	LF SIDE	2014-10-14	10:31:14	3.2	Pass
2	175.1	6.0661	199.0	FLAT	2.45	0.00	LF SIDE	2014-10-14	10:31:28	2.9	Pass
3	160.2	6.0825	199.0	FLAT	1.87	0.00	REAR	2014-10-14	10:35:05	2.6	Pass
4	195.4	6.0581	199.0	FLAT	3.26	0.00	REAR	2014-10-14	10:35:19	3.0	Pass

Impact Uni-Axial

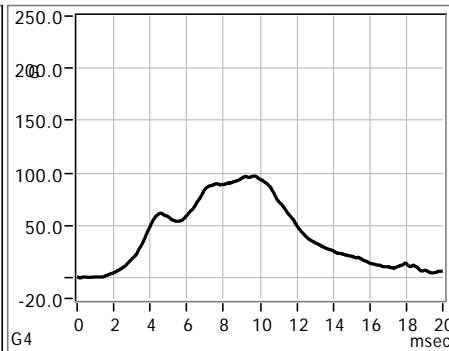
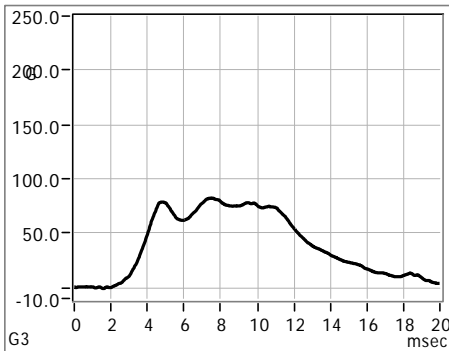
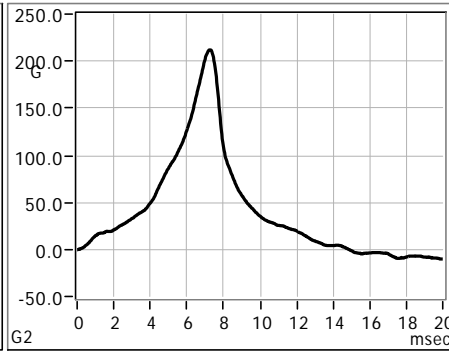
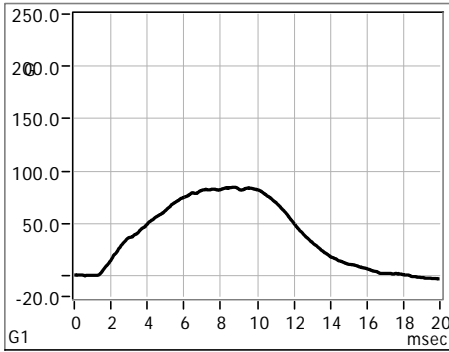
Testing Laboratory : Taicang ACT Lab
 Address : No.35 Zhenghe Road, Ludu Town,
 Taicang City, Suzhou, Jiangsu
 Province, China 215412

Helmet Manufacturer : Bio
 Address :

Laboratory Technician name : Edward

Batch Number :

Ref. P.O. Number :



Model : HY 819
 Color : Black
 Size : XL
 Weight : 820.00 g
 Manufacturing Date : 14 Oct 2014
 Standard Request : FMVSS218
 Identification Code : 539.0020.002-D
 Headform Model : D.O.T.
 Headform Size : D D.O.T
 Conditioning : Wet
 Laboratory Temperature : 22 deg C
 Laboratory Humidity : 57 %
 Selected Filter Frequency : 1650 Hz
 Maximum Peak G's authorized : 400 G
 Maximum Peak m/s² authorized : 3923 m/s²
 Drop mass assembly : 6.100 kg
 Time gate flag height : 25.60 mm
 Acc. sensibility (axis Z) : 10.12

Impact #	Peak Acc. (G)	Velocity IN (m/sec)	Drop Height (cm)	Anvil type	Delta T 150G (msec)	Delta T 200G (msec)	Position	Test Date	Test Time	Friction (%)	PASS or FAIL
5	84.4	5.2175	149.0	HEMI	0.00	0.00	FRONT	2014-10-14	10:42:45	3.5	Pass
6	211.8	5.2174	149.0	HEMI	1.41	0.52	FRONT	2014-10-14	10:43:15	3.5	Pass
7	82.5	5.2306	149.0	HEMI	0.00	0.00	RT SIDE	2014-10-14	10:51:12	3.2	Pass
8	97.0	5.2150	149.0	HEMI	0.00	0.00	RT SIDE	2014-10-14	10:51:26	3.5	Pass

DOT Auto – Test results

Laboratory

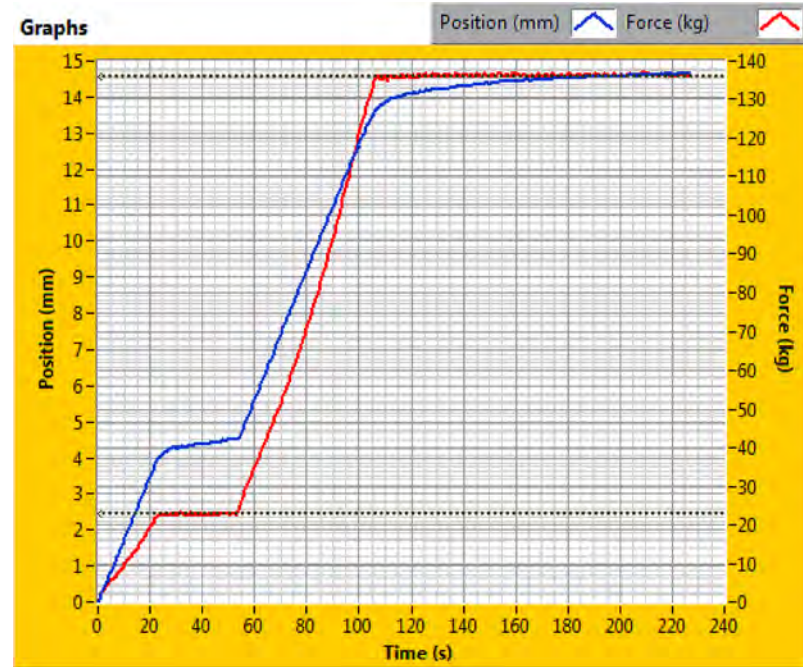
Laboratory ACT Lab
 Technician Carry
 Temperature 22°C
 Humidity 57%

Sample

Model HY 819
 Color Black
 Size XL
 Weight 820
 Manufacturer Bio
 Manuf. Date 08/14

Infos

Standard FMVSS No.218
 Comment 539.0020.002-A



Results

Test	Time Data D/M/Y h:ms	DL ?	Status	Tar1 (Kg)	Tar1 (S)	Tar2 (Kg)	Tar2 (S)	Delta(Del1 to Del2) (mm)	Pass/Fail
Test#1	(14/10/14 14:03:56)	YES	Valid	22.7	30.0	136.1	120.0	9.9	Pass

DOT Auto – Test results

Laboratory

Laboratory ACT Lab
 Technician Carry
 Temperature 22°C
 Humidity 57%

Sample

Model HY 819
 Color Black
 Size XL
 Weight 822
 Manufacturer Bio
 Manuf. Date 08/14

Infos

Standard FMVSS No.218
 Comment 539.0020.002-B



Results

Test	Time Data D/M/Y h:ms	DL ?	Status	Tar1 (Kg)	Tar1 (S)	Tar2 (Kg)	Tar2 (S)	Delta(Del1 to Del2) (mm)	Pass/Fail
Test#2	[14/10/14 14:09:48]	YES	Valid	22.7	30.0	136.1	120.0	14.7	Pass

DOT Auto – Test results

Laboratory

Laboratory ACT Lab
 Technician Carry
 Temperature 22°C
 Humidity 57%

Sample

Model HY 819
 Color Black
 Size XL
 Weight 820
 Manufacturer Bio
 Manuf. Date 08/14

Infos

Standard FMVSS No.218
 Comment 539.0020.002-C



Results

Test	Time Data D/M/Y h:ms	DL ?	Status	Tar1 (Kg)	Tar1 (S)	Tar2 (Kg)	Tar2 (S)	Delta(Del1 to Del2) (mm)	Pass/Fail
Test#3	[14/10/14 14:17:23]	YES	Valid	22.7	30.0	136.1	120.0	8.9	Pass

DOT Auto – Test results

Laboratory

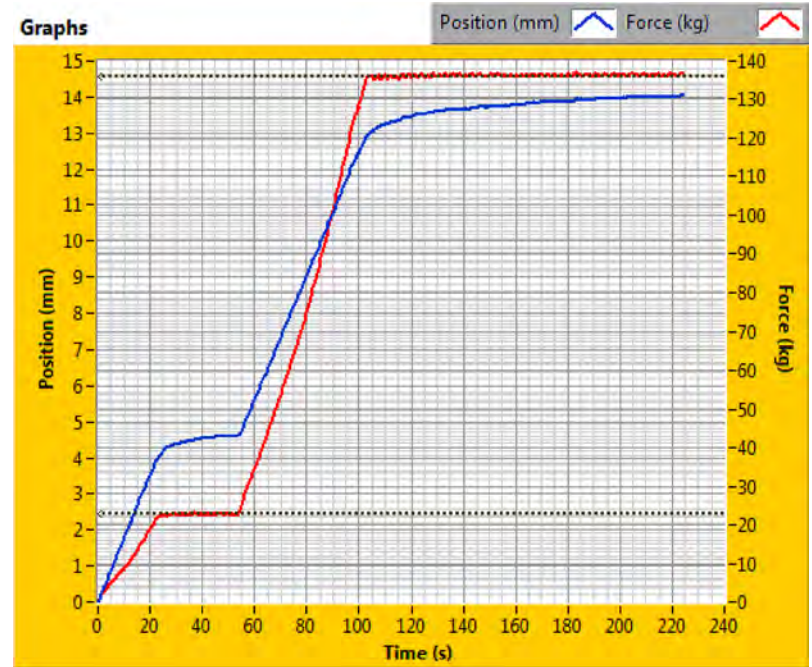
Laboratory ACT Lab
 Technician Carry
 Temperature 22°C
 Humidity 57%

Sample

Model HY 819
 Color Black
 Size XL
 Weight 820
 Manufacturer Bio
 Manuf. Date 08/14

Infos

Standard FMVSS No.218
 Comment 539.0020.002-D



Results

Test	Time Data D/M/Y h:ms	DL ?	Status	Tar1 (Kg)	Tar1 (S)	Tar2 (Kg)	Tar2 (S)	Delta(Del1 to Del2) (mm)	Pass/Fail
Test#4	[14/10/14 14:24:26]	YES	Valid	22.7	30.0	136.1	120.0	9.2	Pass

APPENDIX A
INTERPRETATIONS OR DEVIATIONS FROM FMVSS 218

None

APPENDIX B

EQUIPMENT LIST AND CALIBRATION SCHEDULES

EQUIPMENT INFORMATION

General Information

Drop System: Monorail
Software: Cadex Impact Software v 6.4f

Item	Model	S/N
Computer	VD200PA#AB2	CNG9211DB1
Data Acquisition Board	187570H-01	13EC16A
Time Gate	Cadex	HVTG12009033-1
Control Box	PC4300	CCS120090331-1

Headforms

Item		Model	Assembly Wt., grams
Uni-Axial	Headform Size A DOT SMALL	Cadex	3454
Uni-Axial	Headform Size C DOT MEDIUM	Cadex	4941
Uni-Axial	Headform Size D DOT LARGE	Cadex	6071

Sensors

Item		Model	S/N
Uni-Axial	Accelerometer - axis Z (10.120 mV/G)	2262A-1000	L14909

EQUIPMENT LIST AND CALIBRATION SCHEDULES

DOT Fixtures						
<i>Label</i>	<i>Description</i>	<i>Manufacture</i>	<i>Model</i>	<i>S/N</i>	<i>Dimensional Check</i>	<i>Next</i>
	Monorail	CadexInc	None	None	13 Sep 2014	13 Sep 2015
	Penetrator Tube	ACT Lab	None	None	13 Sep 2014	13 Sep 2015
	Penetrator Dart	CadexInc	ONE 7-10-7	None	13 Sep 2014	13 Sep 2015
	DOT Small Headform	CadexInc	None	5178	13 Sep 2014	13 Sep 2015
	DOT Medium Headform	CadexInc	None	5179	13 Sep 2014	13 Sep 2015
	DOT Large Headform	CadexInc	None	5199	13 Sep 2014	13 Sep 2015
	Reference Headform	CadexInc	None	5181	13 Sep 2014	13 Sep 2015
	Reference Headform	CadexInc	None	5182	13 Sep 2014	13 Sep 2015
	Reference Headform	CadexInc	None	5183	13 Sep 2014	13 Sep 2015
	MEP Pad	CadexInc	None	981220	13 Sep 2014	13 Sep 2015
	Anvil	CadexInc	Flat	None	13 Sep 2014	13 Sep 2015
	Anvil	CadexInc	Hemi	None	13 Sep 2014	13 Sep 2015
	High temp Cabinet	Shanghai Boxn	GZX-9240MBE	8285	13 Sep 2014	13 Sep 2015
	Low temp Cabinet	Haier	DW-25W300	BR062100NO OB29578VMO	13 Sep 2014	13 Sep 2015
	Water conditioning Container	None	None	None	13 Sep 2014	13 Sep 2015
	Retention Strength Tester	CadexInc	None	None	13 Sep 2014	13 Sep 2015
	Laser Level	CadexInc	None	None	13 Sep 2014	13 Sep 2015
	Computer	HP	DX2040	CNG9211DB1	13 Sep 2014	13 Sep 2015

DOT Calibrated Measurement Equipment

Description	Manufacture	Model	S/N	Range	Accuracy from Cal Certs	Calibration			Maintenance	
						Last	Next	by	Last	Next
Velocity Gate Flag	CadexInc	None	None	25.6 mm	1.00 mm	13 Sep 2014	13 Sep 2015	ACT	13 Sep 2014	13 Sep 2015
Accelerometer	PCB	353B18	131607	2000 g	2.71%	13 Sep 2014	13 Sep 2015	KSFY	13 Sep 2014	13 Sep 2015
Power Supply	Santak	MT100	None	-		-	-	-	-	-
Charge Amplifier	Schaevitz	ATA2001	None	-		25 Nov 2013	25 Nov 2014	NIM	25 Nov 2013	25 Nov 2014
Control Center System	Cadex	Pc4300	None	-	0.16 ms	-	-	-	-	-
Velocity Gate	CadexInc	None	HVTG120090 331-1	-		31 Mar 2014	NA	CadexInc	31 Mar 2014	NA
Environmental Monitoring	Taiwan Taishi	1360A	090602605	-40 to +95C	2	13 Sep 2014	NA	KSFY	13 Sep 2014	NA
Scale	Henxin	ACS-6	0118223	0-6000 g	0.050 g	12 May 2014	12 May 2015	KSFY	12 May 2014	12 May 2015
Loadcell	CadexInc	9363-b10-300-20T1R	None	300 lbs.	0.1	8 Sep 2014	8 Sep 2015	KSFY	8 Sep 2014	8 Sep 2015
LVDT	Volfa	LWE-200	20028265	2.5 inch	0.01	8 Sep 2014	8 Sep 2015	KSFY	19 Sep 2013	19 Sep 2014
Peripheral Vision Apparatus	Ludufactory	None	None	105 degree	0.7 degree	8 Sep 2014	8 Sep 2015	ACT	14 Sep 2013	14 Sep 2014
Digital Caliper	JS	150X0.01	300065	0-150 mm	0.01 mm	3 May 2014	3 May 2015	KSFY	3 May 2014	3 May 2015
Height Gauge	Shanghai LR	None	9090053	0-500 mm	0.01 mm	8 Sep 2014	8 Sep 2015	KSFY	8 Sep 2014	8 Sep 2015

Contract File No.: 539.0020

Test File: 002

Technician: Kidman Yu

Test Date: 14 October 2014

T:\Templates\DOT Helmet Templates\Official DOT Report Template for ACT Taicang 17 July 2013.dot

Control Document Rev. 17 July 2013

APPENDIX C
PHOTOGRAPHS



Monorail Apparatus



Retention System
Strength Test Apparatus



Data Acquisition Equipment



High Temperature Chamber



Low Temperature
Conditioning Cabinet



Water Immersion
Equipment







