

H124

# Dynamic Research, Inc.

Test Report: 165-67-1

## TEST RESULT SUMMARY

DRI-TM-15-20

13 March 2015

T.A. Smith  
John E. Koerner

Prepared For: Fenno Law Firm, LLC  
171 Church St, Suite 160  
Charleston, SC 29401

P.O./ Contract #: 165-67-1

Test Standard: MIL-H-43925D

## **EQUIPMENT INFORMATION**

### Headform

DOT Medium  
Headform Serial Number: RMS053  
Headform Weight: 3.202 kg  
Monorail Drop System Weight: 5.063 kg

### Impact Test Apparatus

Accelerometer: PCB Piezotronics Model 353B18 (S/N 109429)  
Calibration period: 1 year  
Date of last calibration: 2/11/2015

Velocity Gate: Cadex (S/N CCS030703-1)  
Calibration period: 5 years  
Date of last calibration: 9/29/2014

### Retention Test Apparatus

Potentiometer: Unimeasure Model P510-25 (S/N 30050277)  
Calibration period: 5 years  
Date of last calibration: 3/13/2012

Load Cell: Nikkei Model NS-1K (S/N W79144)  
Calibration period: 5 years  
Date of last calibration: 3/13/2012

### Data Acquisition and Storage

Computer: Dell Dimension XPS D233  
Data Acquisition Board: National Instruments PCI 6023E  
Software: Cadex Software Version 6.9a

## TEST CRITERIA

- Test Sequence:
1. Pre-test System Check
  2. Impact Energy Attenuation Tests
  3. Post-test System Check
  4. Strength of Retention System Test

### Impact Energy Attenuation

Reference Standard: MIL-H-43925D (Section 4.5.4) and ANSI Z90.1b-1979

Impact Anvil: Flat

Impact Velocity: 19.6 ft/s +0.3 -0.0 ft/s

### Strength of Retention System

Reference Standard: MIL-H-43925D (Section 4.5.9) and ANSI Z90.1b-1979 (section 11.1)

Pass/Fail Criteria: MIL-H-4392D (Section 3.5.8). There shall be no separation of the snap fastener components, swivel fastener components. The grommets and snap fasteners shall not pull out from the material.

### Environmental Conditioning Requirements:

|         |                                 |
|---------|---------------------------------|
| Ambient | 22° to 30°C, 30 to 70% humidity |
| Hot     | 48° to 52°C                     |
| Cold    | -8° to -12°C                    |
| Wet     | 20° to 30°C                     |

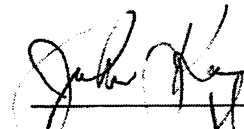
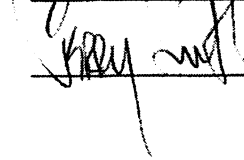
## SUMMARY REPORT

Report Number: 165-67-1  
Test Date: 13 March 2015

Prepared For: Christina Humphries  
Fenno Law Firm

Tested By: John E. Koerner

Reviewed By: Terry A. Smith

 3/13/2015  
 3/13/15.

### HELMET DATA

| Helmet ID | Model   | Size   | Headform Size | Weight (g) | Cond.   |
|-----------|---------|--------|---------------|------------|---------|
| HELO1D    | HHC-HPH | Medium | Medium        | 1258       | Hot     |
| HELO2B    | HHC-HPH | Medium | Medium        | 1282       | Wet     |
| HELO3C    | HHC-HPH | Medium | Medium        | 1266       | Cold    |
| HELO4A    | HHC-HPH | Medium | Medium        | 1322       | Ambient |

### Comments

Helmets tested without communication hardware. These tests are not within the current scope of ISO 17025 accreditation of the Dynamic Research Inc. Impact Test Laboratory.

### SYSTEM CHECK

|  | Drop # | Impact Vel<br>(m/s) | Peak Acc<br>(g) | Comment |
|--|--------|---------------------|-----------------|---------|
| Pre-test   | 1      | 5.51                | 411.9           |         |
|  | 2      | 5.49                | 411.4           |         |
|  | 3      | 5.50                | 411.9           |         |
| Pre-test average                                   |        |                     | 411.7           |         |
| Post test  | 1      | 5.51                | 417.9           |         |
|  | 2      | 5.58                | 410.4           |         |
|  | 3      | 5.56                | 411.9           |         |
| Post test average                                  |        |                     | 413.4           |         |
| Difference between pre-test and post test averages |        |                     | -1.7            |         |

#### Environmental Conditions at time of testing:

Ambient            23.7°C, 44 % humidity  
Hot                 51.2°C  
Cold                -10°C  
Wet                 21.1°C

As measured at 10:00 a.m. on 13 March 2015

## IMPACT TEST SUMMARY

| Helmet ID | Cond.   | Impact # | Impact Location | Anvil | Drop Height (in) | Velocity (ft/sec) | Peak Acc. (g) | Pass/Fail |
|-----------|---------|----------|-----------------|-------|------------------|-------------------|---------------|-----------|
| HELO1D    | Hot     | 1        | REAR            | FLAT  | 77               | 19.7              | 203.2         | Pass      |
| HELO1D    | Hot     | 2        | FRONT           | FLAT  | 77               | 19.8              | 121.9         | Pass      |
| HELO1D    | Hot     | 3        | R SIDE          | FLAT  | 77               | 19.7              | 218.8         | Pass      |
| HELO1D    | Hot     | 4        | L SIDE          | FLAT  | 77               | 19.8              | 211.7         | Pass      |
| HELO1D    | Hot     | 5        | CROWN           | FLAT  | 77               | 19.6              | 190.7         | Pass      |
| HELO2B    | Wet     | 1        | REAR            | FLAT  | 77               | 19.7              | 129.4         | Pass      |
| HELO2B    | Wet     | 2        | FRONT           | FLAT  | 77               | 19.7              | 103.9         | Pass      |
| HELO2B    | Wet     | 3        | R SIDE          | FLAT  | 77               | 19.8              | 141.5         | Pass      |
| HELO2B    | Wet     | 4        | L SIDE          | FLAT  | 77               | 19.8              | 144.0         | Pass      |
| HELO2B    | Wet     | 5        | CROWN           | FLAT  | 77               | 19.9              | 153.0         | Pass      |
| HELO3C    | Cold    | 1        | REAR            | FLAT  | 77               | 19.7              | 159.5         | Pass      |
| HELO3C    | Cold    | 2        | FRONT           | FLAT  | 77               | 19.7              | 103.9         | Pass      |
| HELO3C    | Cold    | 3        | R SIDE          | FLAT  | 77               | 19.7              | 167.1         | Pass      |
| HELO3C    | Cold    | 4        | L SIDE          | FLAT  | 77               | 19.9              | 205.2         | Pass      |
| HELO3C    | Cold    | 5        | CROWN           | FLAT  | 77               | 19.8              | 219.8         | Pass      |
| HELO4A    | Ambient | 1        | REAR            | FLAT  | 77               | 19.7              | 204.7         | Pass      |
| HELO4A    | Ambient | 2        | FRONT           | FLAT  | 77               | 19.7              | 187.1         | Pass      |
| HELO4A    | Ambient | 3        | R SIDE          | FLAT  | 77               | 19.9              | 174.6         | Pass      |
| HELO4A    | Ambient | 4        | L SIDE          | FLAT  | 77               | 19.8              | 176.6         | Pass      |
| HELO4A    | Ambient | 5        | CROWN           | FLAT  | 77               | 19.8              | 192.7         | Pass      |

**Comment:**

Due to the design of the test headform, the crown impact location was set at 0.6 degrees rearward to the horizontal.

## RETENTION TEST SUMMARY

| Helmet ID | Standard     | Model   | Headform Size | Condition | Maximum Elongation (in) | Pass/Fail |
|-----------|--------------|---------|---------------|-----------|-------------------------|-----------|
| HELO1D    | MIL-H-43925D | HHC-HPH | Medium        | Hot       | 1.01                    | Pass      |
| HELO2B    | MIL-H-43925D | HHC-HPH | Medium        | Wet       | 1.34                    | Pass      |
| HELO3C    | MIL-H-43925D | HHC-HPH | Medium        | Cold      | 1.09                    | Pass      |
| HELO4A    | MIL-H-43925D | HHC-HPH | Medium        | Ambient   | 0.89                    | Pass      |



**ACCREDITED**

The Impact Test Laboratory at Dynamic Research Inc. is accredited in accordance with International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated January 2009). Accreditation listing and certificate can be found at <http://www.iasonline.org> and confirmation as a third party accredited testing laboratory for CPSC 16 CFR Part 1203 (bicycle helmets) can be found at <http://cpsc.gov/cgi-bin/labapplist.aspx>.