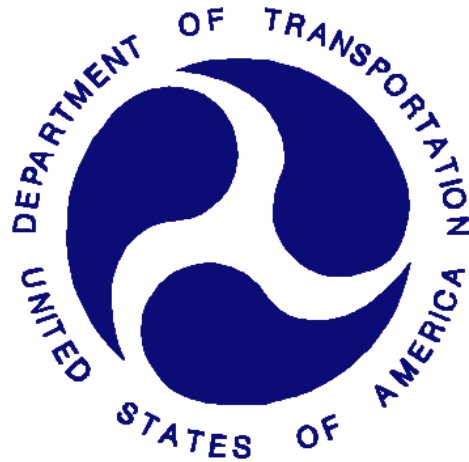


REPORT NUMBER: SINCAP-MGA-2018-012

**NEW CAR ASSESSMENT PROGRAM (NCAP)
Moving Deformable Barrier Side Impact Test**

**TOYOTA MOTOR MANUFACTURING TURKEY INC.
2018 Toyota C-HR XLE 5-Door Hatchback
NHTSA No.: M20185105**

**MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105**



Test Date: October 20, 2017

Final Report Date: December 11, 2017

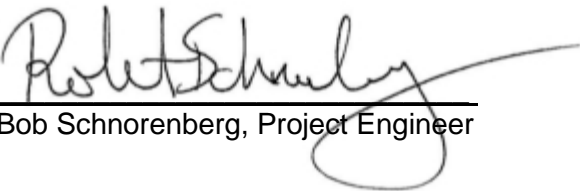
FINAL REPORT

**U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NRM-110
1200 New Jersey Ave, SE
Room W43-410
Washington, DC 20590**

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Prepared by: 
Ben Fischer, Project Engineer

Approved by: 
Bob Schnorenberg, Project Engineer

Approval Date: December 11, 2017

FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

Technical Report Documentation Page

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| 4. Title and Subtitle Final Report of New Car Assessment Program Side Impact MDB Testing of 2018 Toyota C-HR XLE 5-Door Hatchback, NHTSA No.: M20185105 | | 5. Report Date December 11, 2017 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 6. Performing Organization Code MGA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105 | | 10. Work Unit No. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-110) 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C. 20590 | | 13. Type of Report and Period Covered: Final Test Report October 20, 2017 to December 11, 2017 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 14. Sponsoring Agency Code NRM-110 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15. Supplementary Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16. Abstract A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the 2018 Toyota C-HR XLE 5-Door Hatchback in accordance with the specifications of the Office of Crashworthiness Standards NCAP Side Laboratory Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at MGA Research Corporation in Burlington, Wisconsin on October 20, 2017. The impact velocity of the Moving Deformable Barrier (MDB) was 61.21 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 22.1°C. The target vehicle post-test maximum crush was 158 mm at level 3. The test vehicle's performance was as follows: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4" style="text-align: center;">Driver ATD (ES-2re)</th> </tr> <tr> <th style="text-align: left;">Measurement Description</th> <th style="text-align: center;">Units</th> <th style="text-align: center;">Threshold</th> <th style="text-align: center;">Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">1000</td> <td style="text-align: center;">80</td> </tr> <tr> <td>Maximum Thorax Rib Deflection</td> <td style="text-align: center;">mm</td> <td style="text-align: center;">44</td> <td style="text-align: center;">17</td> </tr> <tr> <td>Total Abdominal Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">2500</td> <td style="text-align: center;">559</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td style="text-align: center;">N</td> <td style="text-align: center;">6000</td> <td style="text-align: center;">1863</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td style="text-align: center;">Gs</td> <td style="text-align: center;">82*</td> <td style="text-align: center;">23</td> </tr> </tbody> </table> | | | | Driver ATD (ES-2re) | | | | Measurement Description | Units | Threshold | Result | Head Injury Criteria (HIC ₃₆) | N/A | 1000 | 80 | Maximum Thorax Rib Deflection | mm | 44 | 17 | Total Abdominal Force | N | 2500 | 559 | Pubic Symphysis Force | N | 6000 | 1863 | Resultant Lower Spine Acceleration | Gs | 82* | 23 |
| Driver ATD (ES-2re) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Measurement Description | Units | Threshold | Result | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Head Injury Criteria (HIC ₃₆) | N/A | 1000 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Thorax Rib Deflection | mm | 44 | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Abdominal Force | N | 2500 | 559 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Passenger ATD (SID-IIs) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Measurement Description | Units | Threshold | Result | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Resultant Lower Spine Acceleration | Gs | 82 | 58 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Pelvic Force (sum of acetabular and iliac forces) | N | 5525 | 2260 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Thoracic Rib Deflection | mm | 38* | 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Abdomen Rib Deflection | mm | 45* | 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Proposed IARV | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs | | 18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19. Security Classification of Report Unclassified | 20. Security Classification of Page Unclassified | 21. No. of Pages 223 | 22. Price | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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SECTION 1
TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2018 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00353. The purpose of this test is to generate comparative side impact performance in a 2018 Toyota C-HR XLE 5-Door Hatchback. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Laboratory Test Procedure dated October 2015.

SECTION 2 SUMMARY OF TEST RESULTS

A 2018 Toyota C-HR XLE 5-Door Hatchback was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.21 km/h. The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin on October 20, 2017. Pre-test and post-test photographs of the test vehicle, the MDB, and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS NCAP Side Laboratory Test Procedure dated October 2015. The side impact event was documented by eleven (11) cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

Primary and Redundant Head CG Triaxial Accelerometers
 Chest Upper Rib, Middle Rib, and Lower Rib Y-Axis Displacement Potentiometers
 Abdomen Forward, Middle, and Rear Y-Axis Load Cells
 Lower Spine (T12) Triaxial Accelerometers
 Pubic Symphysis Y-Axis Load Cell

PASSENGER ATD (SID-IIs)

Primary and Redundant Head CG Triaxial Accelerometers
 Primary Head CG Angular Rate Sensors
 Chest Upper Rib, Middle Rib, and Lower Rib Y-Axis Displacement Potentiometers
 Abdomen Upper Rib and Lower Rib Y-Axis Displacement Potentiometers
 Lower Spine (T12) Triaxial Accelerometers
 Acetabulum and Iliac Wing Y-Axis Load Cells

Appendix B contains the dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D contains the test equipment and instrumentation calibration data.

Dummy Injury readings were recorded as follows:

DUMMY INJURY VALUES

| Measurement Description | Driver ATD (ES-2re) | | |
|---|---------------------|-----------|--------|
| | Units | Threshold | Result |
| Head Injury Criteria (HIC ₃₆) | N/A | 1000 | 80 |
| Maximum Thorax Rib Deflection | mm | 44 | 17 |
| Total Abdominal Force | N | 2500 | 559 |
| Pubic Symphysis Force | N | 6000 | 1863 |
| Resultant Lower Spine Acceleration | Gs | 82* | 23 |

| Measurement Description | Passenger ATD (SID-IIs) | | |
|--|-------------------------|-----------|--------|
| | Units | Threshold | Result |
| Head Injury Criteria (HIC ₃₆) | N/A | 1000 | 333 |
| Resultant Lower Spine Acceleration | Gs | 82 | 58 |
| Total Pelvic Force (sum of acetabular and iliac forces) | N | 5525 | 2260 |
| Maximum Thoracic Rib Deflection | mm | 38* | 27 |
| Maximum Abdomen Rib Deflection | mm | 45* | 19 |

*Proposed IARV

Supplemental restraint information is given below:

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

| Restraint Type | Struck Side Driver | | Struck Side Rear Passenger | |
|--------------------------|--------------------|----------|----------------------------|----------|
| | Mounted | Deployed | Mounted | Deployed |
| Frontal Airbag | Yes | No | | |
| Knee Airbag | Yes | No | | |
| Side Curtain Airbag | Yes | Yes | Yes | Yes |
| Side Torso/Pelvis Airbag | Yes | Yes | No | |
| Seat Belt Pretensioner | Yes | Yes | Yes | Yes |
| Seat Belt Load Limiter | Yes | | Yes | |
| Other: Side Torso Airbag | No | | Yes | Yes |

The test data can be found on the NHTSA website at www.nhtsa.dot.gov

GENERAL COMMENTS

Left Lower B-Post Y sensor was not installed.
 Left Lower B-Post Y sensor was not installed.
 Driver Seat Track Y recorded questionable data.
 Left Rear Seat Y recorded questionable data.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

SECTION 3
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

**DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
Test Date: 10/20/2017

TEST VEHICLE INFORMATION AND OPTIONS

| | | | |
|--------------------------|-------------------|-----------------------------------|-----|
| NHTSA No. | M20185105 | Traction Control System (TCS) | Yes |
| Model Year | 2018 | Auto-Leveling System | No |
| Make | Toyota | Automatic Door Locks (ADL) | No |
| Model | C-HR XLE | Power Window Auto-Reverse | Yes |
| Body Style | 5-Door Hatchback | Other Optional Feature | N/A |
| VIN | NMTKHMBX4JR007159 | Driver Front Airbag | Yes |
| Body Color | Ruby Flare Pearl | Driver Curtain Airbag | Yes |
| Odometer Reading (km/mi) | 105km / 65mi | Driver Head/Torso Airbag | No |
| Engine Displacement (L) | 2.0L | Driver Torso Airbag | No |
| Type/No. Cylinders | 4 | Driver Torso/Pelvis Airbag | Yes |
| Engine Placement | Lateral | Driver Pelvis Airbag | No |
| Transmission Type | Automatic | Driver Knee Airbag | Yes |
| Transmission Speeds | CVT | Rear Pass. Curtain Airbag | Yes |
| Overdrive | Yes | Rear Pass. Head/Torso Airbag | No |
| Final Drive | FWD | Rear Pass. Torso Airbag | Yes |
| Roof Rack | No | Rear Pass. Torso/Pelvis Airbag | No |
| Sunroof/T-Top | No | Rear Pass. Pelvis Airbag | No |
| Running Boards | No | Driver Seat Belt Pretensioner | Yes |
| Tilt Steering Wheel | Yes | Rear Pass. Seat Belt Pretensioner | Yes |
| Power Seats | No | Driver Load Limiter | Yes |
| Anti-Lock Brakes (ABS) | Yes | Rear Pass. Load Limiter | Yes |
| | | Other Restraint Feature | N/A |

| | |
|---|-----|
| Does owner's manual provide instruction to turn off automatic door locks? | N/A |
|---|-----|

DATA FROM CERTIFICATION LABEL

| | | | |
|---------------------|---|-----------------|------|
| Manufactured By | TOYOTA MOTOR MANUFACTURING TURKEY INC. | GVWR (kg) | 1964 |
| Date of Manufacture | 03/17 | GAWR Front (kg) | 1050 |
| Vehicle Type | PASSENGER CAR | GAWR Rear (kg) | 1080 |

VEHICLE SEATING AND WEIGHT CAPACITY DATA

| Measured Parameter | Front | Rear | Third | Total | |
|--|-------|------|-------|-------|-------|
| Designated Seating Capacity (DSC) | 2 | 3 | | 5 | |
| Capacity Weight (VCW) (kg) | | | | 375 | (A) |
| DSC x 68.04 kg | | | | 340 | (B) |
| Rated Cargo and Luggage Weight (RCLW) (kg) | | | | 28 | (A-B) |

VEHICLE SEAT TYPE

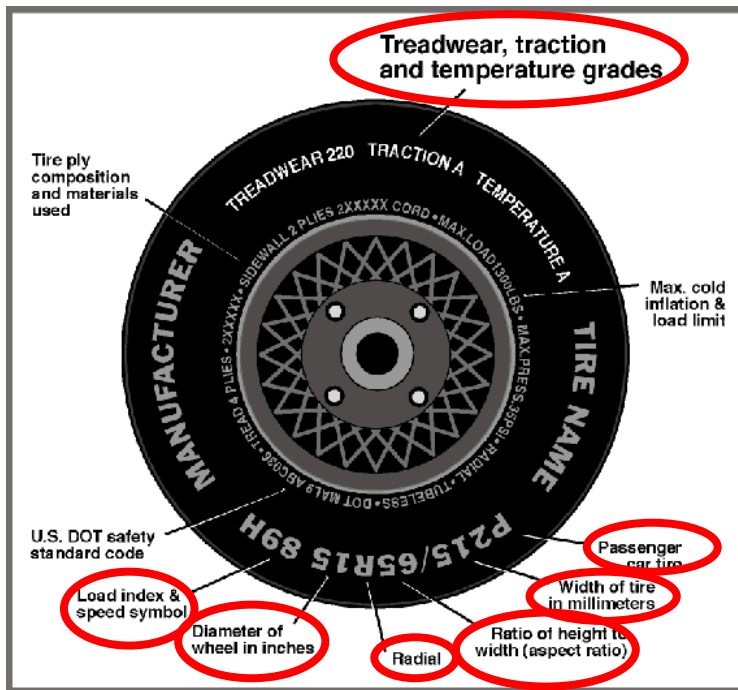
| Seating Location | Type of Seat Pan | | | | Type of Seat Back | | |
|-------------------------|------------------|-------|----------------|-----------|-------------------|------------|-------|
| | Bucket | Bench | Split Bench | Contoured | Fixed | Adjustable | |
| | | | | | | Manual | Power |
| Front Seat | X | | | | | w/ Lever | |
| Rear or Second Row Seat | | | | X | X | | |
| Third Row Seat | | | | | | | |

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017

VEHICLE TIRE INFORMATION



| Measured Parameter | Front | Rear |
|--------------------------|----------------------------------|----------------------------------|
| Max. Tire Pressure (kPa) | 350 | 350 |
| Cold Pressure (kPa) | 230 | 230 |
| Recommended Tire Size | 225/50R18 | 225/50R18 |
| Tire Size on Vehicle | 225/50R18 | 225/50R18 |
| Tire Manufacturer | Dunlop | Dunlop |
| Tire Model | SP Sport 5000 | SP Sport 5000 |
| Treadwear | 340 | 340 |
| Traction | A | A |
| Temperature Grade | A | A |
| Tire Plies Sidewall | 2 Polyester | 2 Polyester |
| Tire Plies Body | 2 Polyester, 2 Steel, 1 Nylon | 2 Polyester, 2 Steel, 1 Nylon |
| Load Index/Speed Symbol | 95V | 95V |
| Tire Material | Rubber | Rubber |
| DOT Safety Code Left | R81N FMDR 2816 | R81N FMDR 2816 |
| DOT Safety Code Right | R81N FMDR 2816 | R81N FMDR 2816 |

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017

TEST PRESSURES

| | Units | LF | RF | LR | RR |
|----------------|-------|-----|-----|-----|-----|
| As Delivered | kPa | 250 | 250 | 255 | 255 |
| Tire Placard | kPa | 230 | 230 | 230 | 230 |
| Owner's Manual | kPa | 230 | 230 | 230 | 230 |
| As Tested | kPa | 230 | 230 | 230 | 230 |

MDB TIRE SPECIFICATIONS

| Requirement | Units | LF | RF | LR | RR |
|-------------|------------|------------|------------|------------|------------|
| Tire Size | P205/75R15 | P205/75R15 | P205/75R15 | P205/75R15 | P205/75R15 |
| Tire | 200 ± 21 | 200 | 200 | 200 | 200 |

TEST VEHICLE AXLE WEIGHTS

| | Units | As Delivered (UVW) | | | As Tested (ATW) | | | Fully Loaded | | |
|--------|-------|--------------------|-------|--------|-----------------|-------|--------|--------------|-------|--------|
| | | Front | Rear | Total | Front | Rear | Total | Front | Rear | Total |
| Left | kg | 459.0 | 300.0 | | 489.5 | 374.0 | | 494.5 | 376.5 | |
| Right | kg | 448.0 | 288.0 | | 464.5 | 319.0 | | 457.0 | 325.0 | |
| Ratio | % | 60.7% | 39.3% | | 57.9% | 42.1% | | 57.6% | 42.4% | |
| Totals | kg | 907.0 | 588.0 | 1495.0 | 954.0 | 693.0 | 1647.0 | 951.5 | 701.5 | 1653.0 |

TARGET TEST WEIGHT CALCULATION

| Measured Parameter | Units | Value | |
|--|-------|--------|---------|
| Total Delivered Weight (UVW) | kg | 1495.0 | (A) |
| Sum of Actual Weight of 2 P572 ATDs Used | kg | 129 | (B) |
| Rated Cargo/Luggage Weight (RCLW) | kg | 28 | (C) |
| Calculated Test Vehicle Target Weight (TVTW) | kg | 1652.0 | (A+B+C) |

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to 9 kg)? **YES**

TEST VEHICLE ATTITUDES AND CG

| | Units | Fully Loaded | As Tested | Meets Requirement*** |
|--|-------|--------------|-----------|----------------------|
| Left Front | mm | 718 | 718 | Yes |
| Right Front | mm | 732 | 723 | Yes |
| Right Rear | mm | 743 | 752 | Yes |
| Left Rear | mm | 733 | 735 | Yes |
| Vehicle CG (Aft of Front Axle) | mm | 1119 | 1109 | |
| Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline) | mm | 41 | 12 | |

*** The "As Tested" vehicle attitude measurements must be equal to or within ± 10 mm of the "Fully Loaded" vehicle attitude measurements at each wheel well.

| | |
|---|----------------|
| Test height adjustable suspension setting, if applicable: | Not Applicable |
|---|----------------|

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
Test Date: 10/20/2017

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

| Component Description | Weight (kg) |
|----------------------------|-------------|
| Weight of Ballast, if any | |
| RF Headrest, LR Tail Light | 2 |

DATA SHEET NO. 2
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the mid-track, lowest, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rear-most, lowest, mid-angle position.

SCRL ANGLE RANGE

| Seat | SCRL (°) | | |
|---------------------------|----------|-------|-------|
| | Max | Min | Mid |
| Driver Seat | 14.5 | 9.8 | 12.2 |
| Front Passenger Seat | 13.9 | 9.1 | 11.5 |
| Front Center Seat | | | |
| Struck Side Rear Seat | Fixed | Fixed | Fixed |
| Non-Struck Side Rear Seat | Fixed | Fixed | Fixed |
| Rear Center Seat | Fixed | Fixed | Fixed |

SEAT HEIGHT AND ANGLE

| Seat | As-Tested SCRL Angle (Mid) | As-Tested SCRP Height (mm) | SCRP Height Position | SCRP Height (mm) | | |
|---------------------------|----------------------------|----------------------------|----------------------|------------------|-------|--------------|
| | | | | Rear-Most | Mid | Forward-Most |
| Driver Seat | 12.2 | Fixed | Max | Fixed | Fixed | Fixed |
| | | | Mid | Fixed | Fixed | Fixed |
| | | | Min | Fixed | Fixed | Fixed |
| Front Passenger Seat | 11.5 | Fixed | Max | Fixed | Fixed | Fixed |
| | | | Mid | Fixed | Fixed | Fixed |
| | | | Min | Fixed | Fixed | Fixed |
| Front Center Seat | | | Max | | | |
| | | | Mid | | | |
| | | | Min | | | |
| Struck Side Rear Seat | Fixed | Fixed | Max | Fixed | Fixed | Fixed |
| | | | Mid | Fixed | Fixed | Fixed |
| | | | Min | Fixed | Fixed | Fixed |
| Non-Struck Side Rear Seat | Fixed | Fixed | Max | Fixed | Fixed | Fixed |
| | | | Mid | Fixed | Fixed | Fixed |
| | | | Min | Fixed | Fixed | Fixed |
| Rear Center Seat | Fixed | Fixed | Max | Fixed | Fixed | Fixed |
| | | | Mid | Fixed | Fixed | Fixed |
| | | | Min | Fixed | Fixed | Fixed |

DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

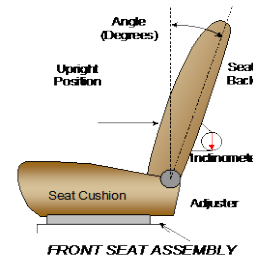
NHTSA No. M20185105
 Test Date: 10/20/2017

SEAT FORE/AFT POSITIONS

| Seat | Total Fore/Aft Travel | | Test Position from Forward-Most Position | |
|---------------------------|-----------------------|--------------------------------|--|-------------------------------|
| | mm | Detents (1 st as 1) | mm | Detent (1 st as 0) |
| Driver Seat | 260 | 27 | 130 | 13 |
| Front Passenger Seat | 260 | 27 | 130 | 13 |
| Front Center Seat | | | | |
| Struck Side Rear Seat | Fixed | | Fixed | |
| Non-Struck Side Rear Seat | Fixed | | Fixed | |
| Rear Center Seat | Fixed | | Fixed | |

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned to the manufacturer's designated design angle. The front passenger's seat back is positioned in a similar manner as the driver's seat back. The struck side rear seat back is adjusted following Appendix C, "Positioning Dummies in the Test Vehicle" in the NCAP Laboratory Test Procedure dated October 2015. The rear center and non-struck side rear outboard seat backs are positioned to match the struck side rear seat back.



| Seat | Total Seat Back Angle Range | | Test Position from Vertical | |
|---------------------------|-----------------------------|--------------------------------|-----------------------------|-------------------------------|
| | Degrees | Detents (1 st as 1) | Degrees | Detent (1 st as 0) |
| Driver Seat | 71.7 | 36 | 2.0 | 4 |
| Front Passenger Seat | 71.5 | 36 | 1.0 | 4 |
| Front Center Seat | | | | |
| Struck Side Rear Seat | Fixed | | 10.0 | |
| Non-Struck Side Rear Seat | Fixed | | 10.0 | |
| Rear Center Seat | Fixed | | 10.0 | |

Seat back angles measured on outboard headrest post.

DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1.

| | Total # of Positions | Placed in Position # |
|-------------|----------------------|----------------------|
| Driver Seat | 4 | 0 (Uppermost as 0) |
| Rear Seat | Fixed | |

HEAD RESTRAINT ADJUSTMENT

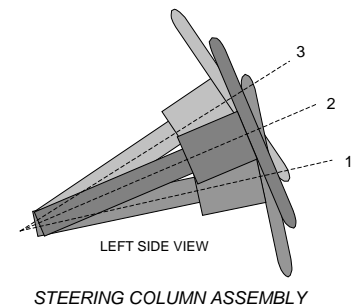
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

| | Total # of Positions | Placed in Position # |
|-------------|----------------------|----------------------------------|
| Driver Seat | 3 | 2 (Lowest as 0) / Fixed Fore-Aft |
| Rear Seat | Fixed | |

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

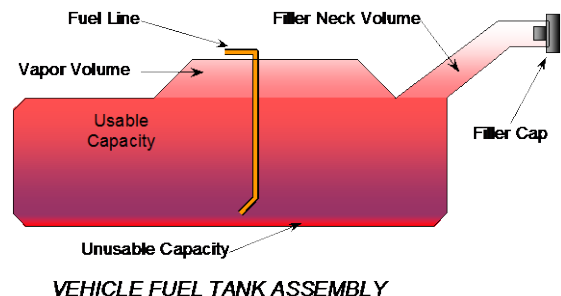
| | Wheel Angle (deg) | Fore/Aft Position (mm) |
|-----------------------------------|-------------------|------------------------|
| Lowermost, Position 1 | 69.6 | 204 |
| Geometric Center, Position 2 | 67.7 | 189 |
| Uppermost, Position 3 | 65.7 | 173 |
| Telescoping Steering Wheel Travel | | 31 |
| Test Position | 67.7 | 189 |



FUEL PUMP

Describe the fuel pump type, details about how it operates and the location of the fuel filler pipe.

The vehicle is equipped with an electronic fuel pump.
The fuel pump is activated when the ignition is turned on. The filler neck is located on the driver's side.



DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
Test Date: 10/20/2017

FUEL TANK CAPACITY DATA

| | Liters |
|---|--------|
| Usable Capacity of Standard Tank (see Form No. 1) | 49.2 |
| Usable Capacity of Optional Tank (see Form No. 1) | |
| Usable Capacity of Standard Tank as Specified in Owner's Manual | 50.0 |
| Usable Capacity of Optional Tank as Specified in Owner's Manual | |
| 93% of Usable Capacity | 45.8 |
| Actual Amount of Solvent Used | 45.8 |
| 1/3 of Usable Capacity | 16.4 |

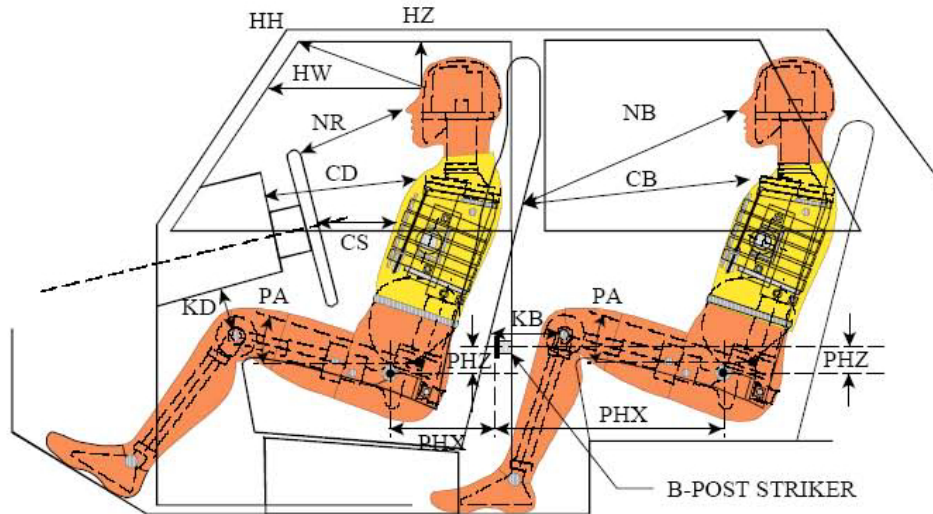
Is the actual amount of solvent used in the test equal to 93% + 1%
of the Usable Capacity stated in Form No. 1?

YES

DATA SHEET NO. 3 DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017



LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN.
 REAR DUMMY PHX & PHZ
 MEASUREMENTS FOR A 4-DOOR
 VEHICLE WOULD USE THE C-POST
 STRIKER AS A REFERENCE POINT

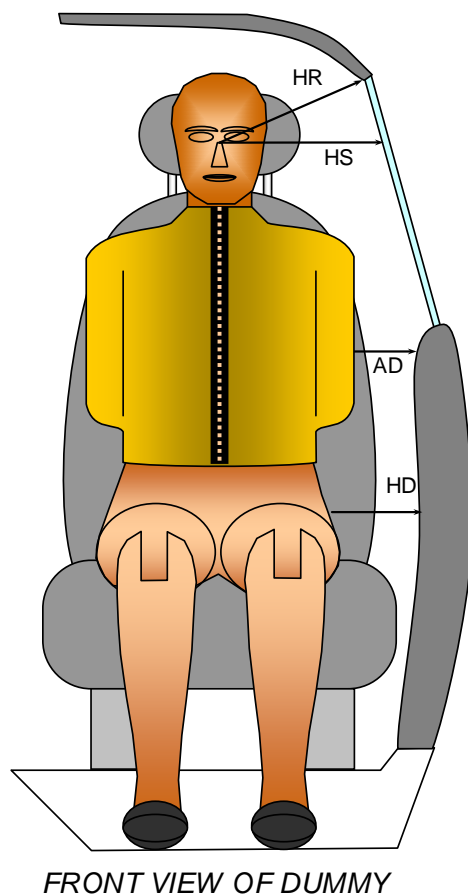
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

| Driver Code | Pass. Code | Measurement Description | Driver | | Passenger | |
|-------------|------------|-------------------------------|-------------|-----------|-------------|-----------|
| | | | Length (mm) | Angle (°) | Length (mm) | Angle (°) |
| HH | | Head to Header | 380 | 7.4 | | |
| HW | | Head to Windshield | 578 | 0 | | |
| HZ | HZ | Head to Roof Liner | 148 | 90 | 268 | 90 |
| NR | NB | Nose to Rim/Seat Back | 425 | 20.2 | 538 | 3.0 |
| CD | CB | Chest to Dashboard/Seat Back | 536 | 4.4 | 545 | 14.2 |
| CS | | Chest to Steering Wheel | 352 | 17.1 | | |
| KDL | KBL | Left Knee to Dash/Seat Back | 160 | 23.4 | 262 | 27.0 |
| KDR | KBR | Right Knee to Dash/Seat Back | 169 | 25.2 | 270 | 27.1 |
| PAX | PAX | Pelvic Tilt Angle X | | 18.2 | | 26.7 |
| PAY | PAY | Pelvic Tilt Angle Y | | -1.1 | | -1.1 |
| PHX | PHX | Hip Point to Striker (X-Axis) | 203 | | 275 | |
| PHZ | PHZ | Hip Point to Striker (Z-Axis) | 232 | | 312 | |

DATA SHEET NO. 4 DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017



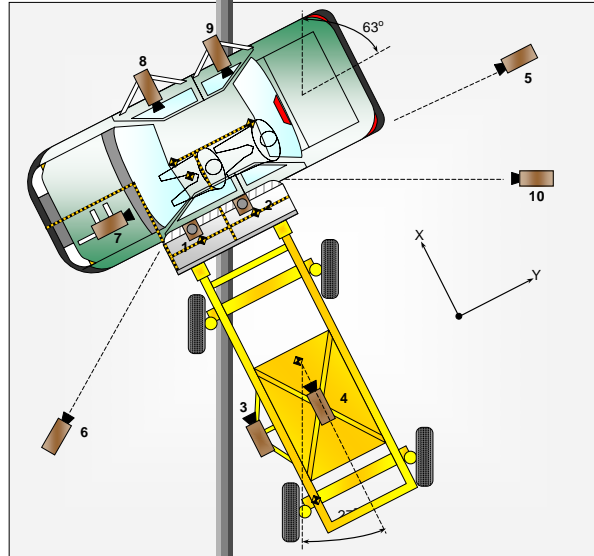
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

| Code | Measurement Description | Units | Driver | Passenger |
|------|-------------------------|-------|--------|-----------|
| HR | Head to Side Header | mm | 157 | 234 |
| HS | Head to Side Window | mm | 284 | 312 |
| AD | Arm to Door | mm | 88 | 163 |
| HD | Hip Point to Door | mm | 142 | 177 |

**DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA**

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017



CAMERA LOCATIONS AND DATA

| No. | Camera View | Coordinates (mm) | | | Lens Length (mm) | Operating Frame Rate (fps) |
|-----|-------------------------|------------------|-------|-------|------------------|----------------------------|
| | | X* | Y* | Z* | | |
| 1 | Overhead Overall | 900 | -980 | -4995 | 14 | 1000 |
| 2 | Overhead Close-Up | 240 | 110 | -4895 | 20 | 1000 |
| 3 | Left Impact Point (MDB) | | | | 50 | 1000 |
| 4 | Side Overall (MDB) | | | | 16 | 1000 |
| 5 | Rear | -90 | 6490 | -1610 | 24 | 1000 |
| 6 | Left Front | -4700 | -1640 | -1530 | 24 | 1000 |
| 7 | Driver Front (OB) | | | | 16 | 1000 |
| 8 | Driver Side (OB) | | | | 8 | 1000 |
| 9 | Passenger Side (OB) | | | | 8 | 1000 |
| 10 | Real Time Left Rear | | | | | 30 |
| 11 | Real Time Inrun | | | | | 30 |

Reference: Impact Point projected to Ground; +X = To Front of MDB, +Y = To Right of MDB, +Z = Down
 * All measurements accurate to ± 6 mm

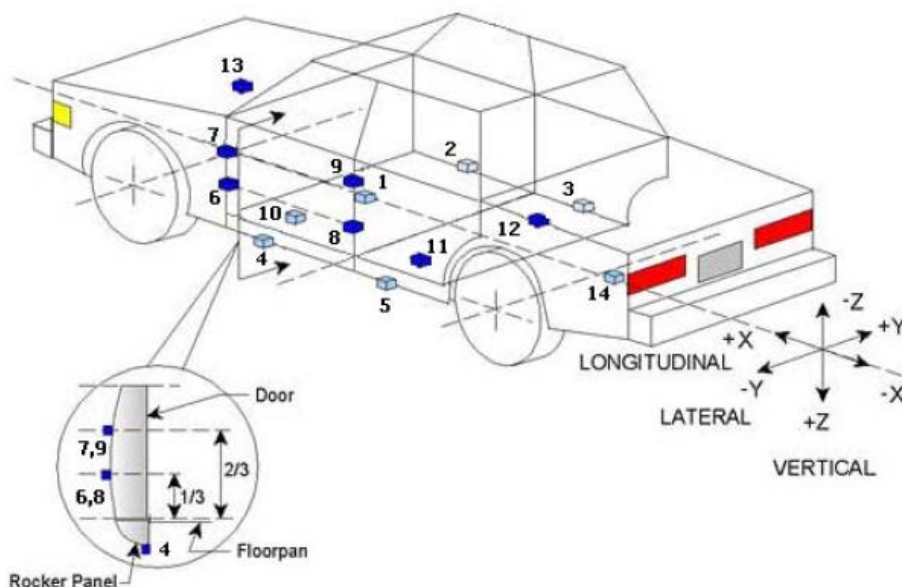
INSTRUMENTATION

| | Number of Channels |
|--------------------|--------------------|
| Driver Dummy | 16 |
| Passenger Dummy | 19 |
| Vehicle Structure | 23 |
| MDB Accelerometers | 5 |
| MDB Contacts | 2 |
| Total | 65 |

DATA SHEET NO. 6 TEST VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017



TEST VEHICLE ACCELEROMETER LOCATIONS

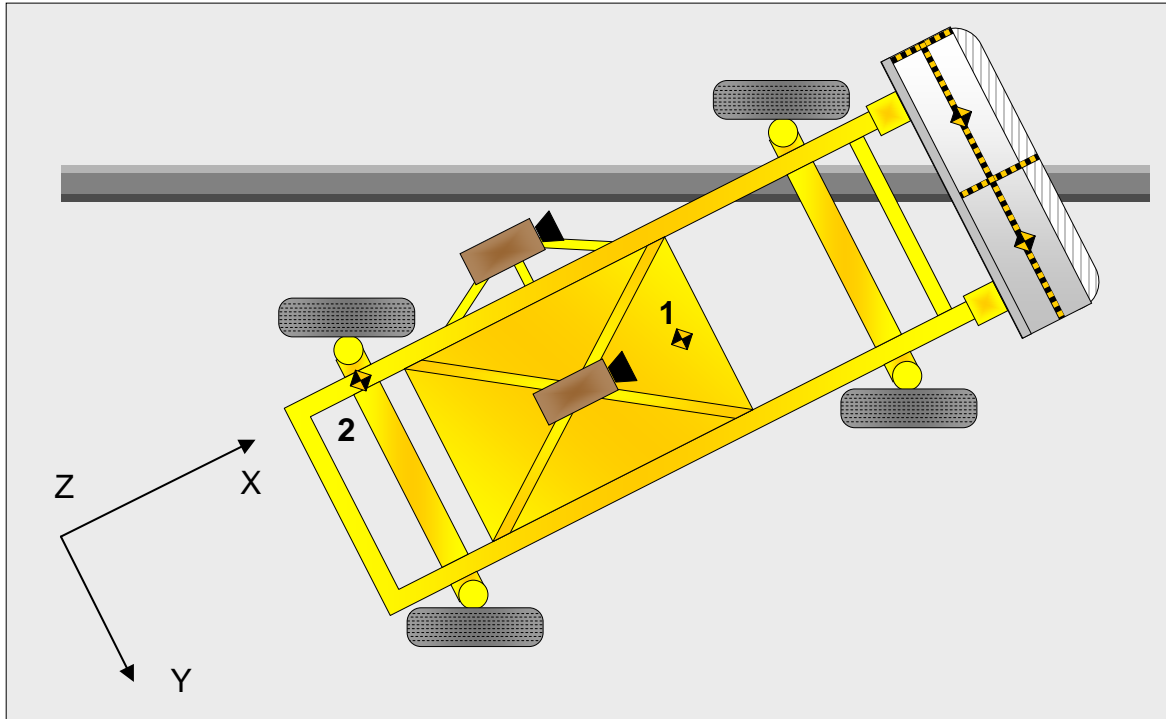
| Accelerometer Location | | | | |
|------------------------|---------------------------|------------------|------|------|
| No. | ID | Coordinates (mm) | | |
| | | X | Y | Z |
| 1 | Vehicle CG | 2340 | 195 | -239 |
| 2 | Right Sill at Front Seat | 2094 | 723 | -234 |
| 3 | Right Sill at Rear Seat | 1241 | 723 | -247 |
| 4 | Left Sill at Front Door | 2312 | -723 | -242 |
| 5 | Left Sill at Rear Door | 1625 | -723 | -252 |
| 6 | Left Lower A-Post | 2945 | -720 | -581 |
| 7 | Left Middle A-Post | 2951 | -798 | -847 |
| 8 | Left Lower B-Post | | | |
| 9 | Left Middle B-Post | | | |
| 10 | Front Seat Track | 1981 | -386 | -282 |
| 11 | Rear Seat Structure | 1602 | -387 | -325 |
| 12 | Rt. Rear Occ. Compartment | 1641 | -378 | -270 |
| 13 | Engine Block | 3610 | 36 | -886 |
| 14 | Rear Above Axle | 910 | 0 | -591 |

Reference: X – Rear Surface of Vehicle (+ forward)
 Y – Vehicle Centerline (+ to right)
 Z – Ground Plane (+ down)

**DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS**

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017



MDB ACCELEROMETER LOCATIONS

| No. | Accelerometer Location | Coordinates (mm) | | |
|-----|------------------------|------------------|------|------|
| | | X | Y | Z |
| 1 | MDB CG | -1105 | 0 | -330 |
| 2 | MDB Rear | -2580 | -650 | -625 |

Reference: X – MDB Face (+ forward)
 Y – MDB Centerline (+ to right)
 Z – Ground Plane (+ down)

**DATA SHEET NO. 8
POST-TEST OBSERVATIONS**

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
Test Date: 10/20/2017

TEST DUMMY INFORMATION AND CONTACT POINTS

| Description | Front Seat Dummy (ES-2re) | Rear Seat Dummy (SID-lis) |
|-------------------|--|--|
| Face | Curtain Airbag, Headliner | Curtain Airbag, Seat Back |
| Top of Head | Headliner | Curtain Airbag, Headliner, Center Headrest |
| Left Side of Head | Curtain Airbag, Headliner | Curtain Airbag |
| Back of Head | Curtain Airbag, Headliner, Headrest | Headrest |
| Left Shoulder | None | Side Torso Airbag, Seat Back |
| Upper Torso | Side Torso/Pelvis Airbag, Seat Back | Side Torso Airbag, Seat Back |
| Lower Torso | Side Torso/Pelvis Airbag, Seat Back | Side Torso Airbag, Seat Back |
| Left Hip | Side Torso/Pelvis Airbag, Seat Cushion | Door Panel |
| Left Knee | Door Panel | Door Panel |

POST-TEST DOOR PERFORMANCE

| Description | Struck Side | | Non-Struck Side | | Rear Hatch / Other Door |
|--|-------------|------|-----------------|------|-------------------------|
| | Front | Rear | Front | Rear | |
| Remained Closed and Operational | No | No | Yes | Yes | Yes |
| Total Separation from Vehicle at Hinges or Latches | No | No | No | No | No |
| Latch or Hinge Systems Pulled Out of Their Anchorages | No | No | No | No | No |
| Disengaged from Latched Position | No | No | No | No | No |
| Latch Separated from Striker | No | No | No | No | No |
| Jammed Shut | Yes | Yes | No | No | No |
| If Door Opened at Striker, Record Width of Opening at Striker (mm) | | | | | |

POST-TEST SEAT PERFORMANCE

| Description | Struck Side | | Non-Struck Side | |
|--|-------------|------|-----------------|------|
| | Front | Rear | Front | Rear |
| Seat Movement Along Seat Track | No | No | No | No |
| Seat Disengagement from Floor Pan | No | No | No | No |
| Seat Back Movement from Initial Position | No | No | No | No |
| Seat Back Collapse | No | No | No | No |

POST-TEST STRUCTURAL OBSERVATIONS

| Critical Areas of Performance | Observations and Conclusions |
|-------------------------------|------------------------------|
| Pillar Performance | No Separation |
| Sill Separation | None |
| Windshield Damage | None |
| Side Window Damage | LF, LR Window Broken |
| Other Notable Effects | None |

**DATA SHEET NO. 8 (CONTINUED)
POST-TEST OBSERVATIONS**

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

| Restraint Type | Struck Side Driver | | Struck Side Rear Passenger | |
|--------------------------|--------------------|----------|----------------------------|----------|
| | Mounted | Deployed | Mounted | Deployed |
| Frontal Airbag | Yes | No | | |
| Knee Airbag | Yes | No | | |
| Side Curtain Airbag | Yes | Yes | Yes | Yes |
| Side Torso/Pelvis Airbag | Yes | Yes | No | |
| Seat Belt Pretensioner | Yes | Yes | Yes | Yes |
| Seat Belt Load Limiter | Yes | | Yes | |
| Other: Side Torso Airbag | No | | Yes | Yes |

IMPACT POINT LOCATION DATA

| Measured Parameter | Units | Tolerance | Value |
|---|-------|---------------------------------|-------|
| Vehicle Wheel Base | mm | | 2636 |
| Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point) | mm | | 378 |
| Actual Impact Point (Aft of Front Axle) | mm | | 421 |
| Horizontal Offset (+forward / -rearward) | mm | +/- 50 of intended impact point | -43 |
| Vertical Offset (+down / -up) | mm | +/- 20 of intended impact point | 7 |

**DATA SHEET NO. 9
MDB SUMMARY OF RESULTS**

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017

MDB SPECIFICATIONS

| Measurement Description | Length (mm) |
|---|-------------|
| Overall Width of Framework Carriage | 1250 |
| Overall Length Including Honeycomb Face | 4119 |
| Wheelbase of Framework Carriage | 2584 |
| CG Location aft of Front Axle | 1128 |

MDB WEIGHTS

| | Units | Front Axle | Rear Axle | Total |
|--------|-------|------------|-----------|--------|
| Left | kg | 427.9 | 264.0 | |
| Right | kg | 340.6 | 331.2 | |
| Ratio | % | 56.4 | 43.6 | |
| Totals | kg | 768.5 | 595.2 | 1363.7 |

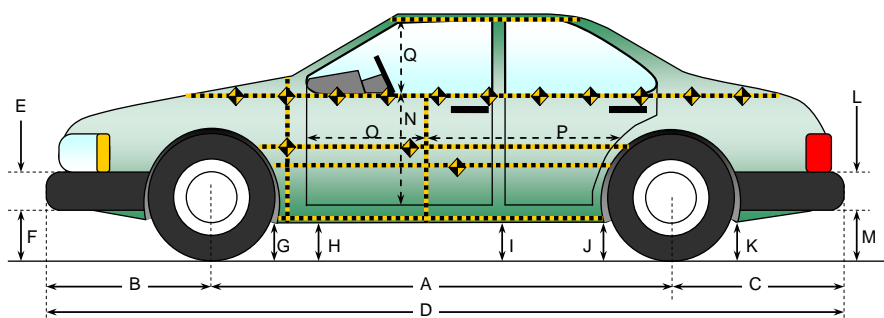
SPEED AND ANGLE AT IMPACT DATA

| Measured Parameter | Units | Requirement | Value |
|---|---------|--------------|-------|
| Trap No. 1 Velocity (Primary) | km/h | 61.1 to 62.7 | 61.21 |
| Trap No. 2 Velocity (Redundant) | km/h | 61.1 to 62.7 | 61.34 |
| MDB CL to Target Vehicle CL | degrees | 88.5 to 91.5 | 89.7 |
| MDB Forward Line of Motion to Target Vehicle CL | degrees | 62.5 to 63.5 | 62.9 |
| MDB Crabbed Angle to MDB Forward Line of Motion | degrees | 26 to 28 | 26.4 |

**DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
Test Date: 10/20/2017



All measurements in (mm) with tolerance of ± 3 mm

LEFT SIDE VIEW

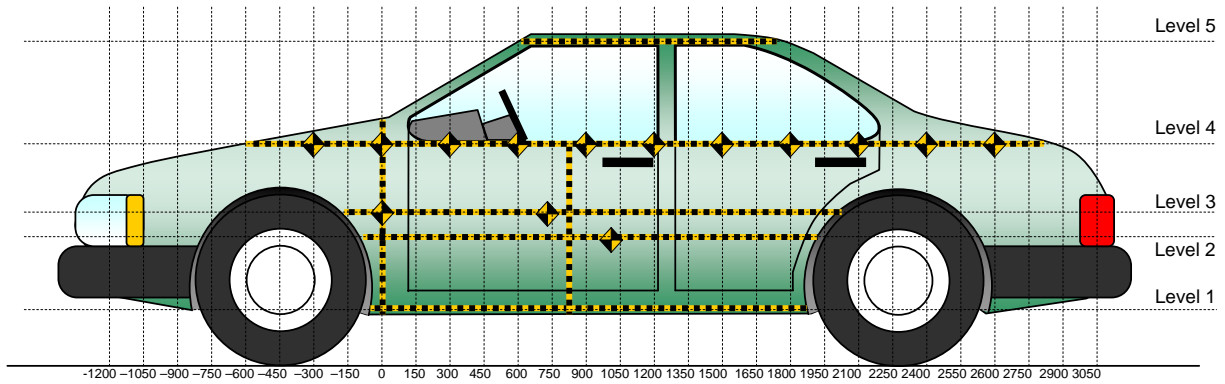
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

| Code | Measurement Description | Pre-Test | Post-Test | Difference |
|------|--|----------|-----------|------------|
| A | Wheelbase | 2636 | 2637 | -1 |
| B | Front Axle to FSOV | 970 | 977 | -7 |
| C | Rear Axle to RSOV | 815 | 807 | 8 |
| D | Total Length at Centerline | 4421 | 4421 | 0 |
| E | Front Bumper Thickness | 140 | 140 | 0 |
| F | Front Bumper Bottom to Ground | 210 | 208 | 2 |
| G | Sill Height at Front Wheel Well | 213 | 214 | -1 |
| H | Sill Height at Front Door Leading Edge | 212 | 213 | -1 |
| I | Sill Height at B Pillar | 228 | 225 | 3 |
| J1 | Sill Height at Rear Wheel Well | 209 | 214 | -5 |
| J2 | Pinch Weld Height at Rear Wheel Well | 220 | 223 | -3 |
| K | Sill Height Aft of Rear Wheel Well | 215 | 233 | -18 |
| L | Rear Bumper Thickness | 133 | 133 | 0 |
| M | Rear Bumper Bottom to Ground | 324 | 343 | -19 |
| N | Sill Height to Window Bottom Sill | 642 | 601 | 41 |
| O | Front Door Leading Edge to Impact CL | 771 | 739 | 32 |
| P | Rear Door Trailing Edge to Impact CL | 1125 | 1071 | 54 |
| Q | Front Window Opening | 402 | 418 | -16 |
| R | Right Side Length | 3458 | 3456 | 2 |
| S | Left Side Length | 3458 | 3454 | 4 |
| T | Vehicle Width at B Post | 1767 | 1670 | 97 |

DATA SHEET NO. 11
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017



All Measurements Shown in mm

LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

| Level | Measurement Description | Height Above Ground | Maximum Exterior Static Crush | Distance from Impact |
|-------|-------------------------|---------------------|-------------------------------|----------------------|
| 1 | Sill Top | 520 | 115 | 150 |
| 2 | Occupant H-Point | 621 | 137 | 750 |
| 3 | Mid Door | 676 | 158 | 450 |
| 4 | Window Sill | 986 | 63 | 750 |
| 5 | Window Top | 1450 | 5 | 1800 |

Note: The measurements are taken along the vertical impact reference line. Vehicle measurements forward of the vertical impact reference line are negative.

DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017

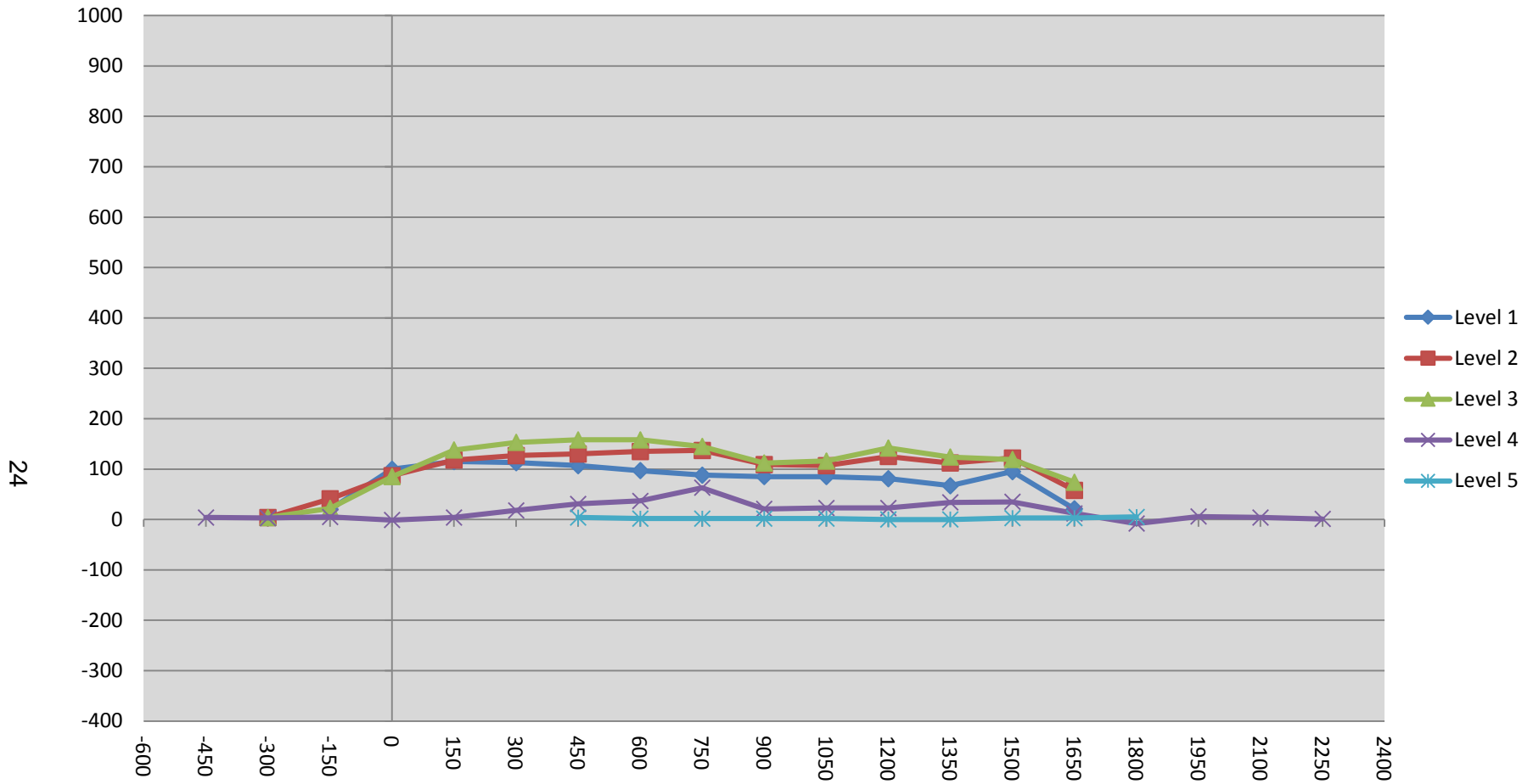
| | Pre-Test | | | | | Post-Test | | | | | Difference | | | | |
|-------|----------|-----|-----|-----|-----|-----------|-----|-----|-----|-----|------------|-----|-----|----|---|
| | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| -2100 | | | | | | | | | | | | | | | |
| -1950 | | | | | | | | | | | | | | | |
| -1800 | | | | | | | | | | | | | | | |
| -1650 | | | | | | | | | | | | | | | |
| -1500 | | | | | | | | | | | | | | | |
| -1350 | | | | | | | | | | | | | | | |
| -1200 | | | | | | | | | | | | | | | |
| -1050 | | | | | | | | | | | | | | | |
| -900 | | | | | | | | | | | | | | | |
| -750 | | | | | | | | | | | | | | | |
| -600 | | | | | | | | | | | | | | | |
| -450 | | | | 324 | | | | | 328 | | | | | 4 | |
| -300 | | 201 | 205 | 306 | | | 205 | 209 | 309 | | | 4 | 4 | 3 | |
| -150 | 212 | 222 | 220 | 292 | | 232 | 263 | 242 | 297 | | 20 | 41 | 22 | 5 | |
| 0 | 230 | 218 | 214 | 290 | | 330 | 305 | 299 | 289 | | 100 | 87 | 85 | -1 | |
| 150 | 224 | 217 | 212 | 271 | | 339 | 335 | 350 | 275 | | 115 | 118 | 138 | 4 | |
| 300 | 220 | 215 | 210 | 250 | | 333 | 342 | 363 | 268 | | 113 | 127 | 153 | 18 | |
| 450 | 222 | 215 | 210 | 240 | 529 | 329 | 345 | 368 | 271 | 533 | 107 | 130 | 158 | 31 | 4 |
| 600 | 226 | 214 | 210 | 237 | 502 | 323 | 349 | 368 | 274 | 504 | 97 | 135 | 158 | 37 | 2 |
| 750 | 232 | 213 | 211 | 237 | 491 | 320 | 350 | 356 | 300 | 493 | 88 | 137 | 145 | 63 | 2 |
| 900 | 236 | 211 | 211 | 234 | 489 | 321 | 320 | 323 | 255 | 491 | 85 | 109 | 112 | 21 | 2 |
| 1050 | 242 | 210 | 210 | 237 | 487 | 327 | 317 | 326 | 260 | 489 | 85 | 107 | 116 | 23 | 2 |
| 1200 | 244 | 219 | 209 | 239 | 492 | 325 | 344 | 351 | 262 | 492 | 81 | 125 | 142 | 23 | 0 |
| 1350 | 237 | 229 | 222 | 242 | 495 | 304 | 341 | 346 | 276 | 495 | 67 | 112 | 124 | 34 | 0 |
| 1500 | 221 | 218 | 221 | 247 | 498 | 316 | 340 | 340 | 282 | 501 | 95 | 122 | 119 | 35 | 3 |
| 1650 | 210 | 204 | 203 | 254 | 510 | 231 | 262 | 277 | 266 | 513 | 21 | 58 | 74 | 12 | 3 |
| 1800 | | | | 258 | 524 | | | | 250 | 529 | | | | -8 | 5 |
| 1950 | | | | 282 | | | | | 288 | | | | | 6 | |
| 2100 | | | | 303 | | | | | 307 | | | | | 4 | |
| 2250 | | | | 335 | | | | | 336 | | | | | 1 | |
| 2400 | | | | | | | | | | | | | | | |
| 2550 | | | | | | | | | | | | | | | |
| 2700 | | | | | | | | | | | | | | | |
| 2850 | | | | | | | | | | | | | | | |
| 3000 | | | | | | | | | | | | | | | |
| 3150 | | | | | | | | | | | | | | | |
| 3300 | | | | | | | | | | | | | | | |
| 3450 | | | | | | | | | | | | | | | |
| 3600 | | | | | | | | | | | | | | | |
| 3750 | | | | | | | | | | | | | | | |
| 3900 | | | | | | | | | | | | | | | |

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point.

DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

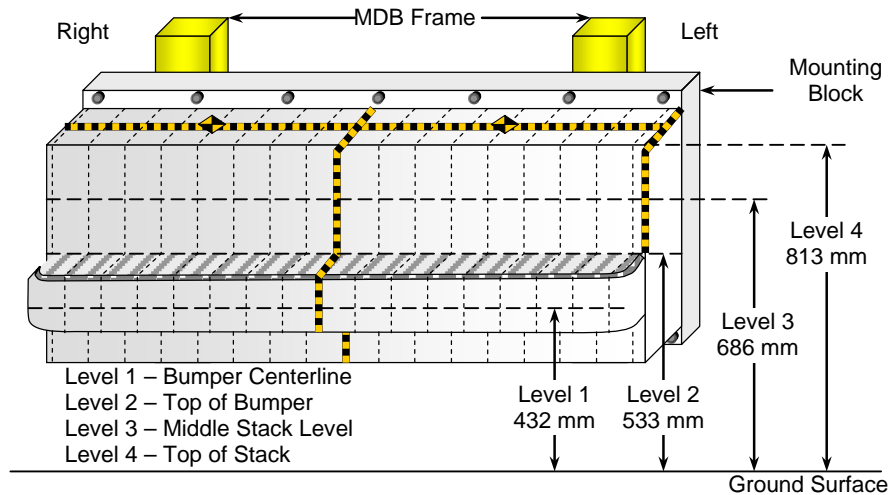
NHTSA No. M20185105
Test Date: 10/20/2017



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017



FRONT VIEW

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

| Vertical Location | | | From Centerline | | Maximum Crush |
|-------------------|------------------|--------|-----------------|-----------|---------------|
| Row | Description | Height | Distance | Direction | |
| A | Center of Bumper | 432 | 800 | Left | 206 |
| B | Top of Bumper | 533 | 800 | Right | 147 |
| C | Mid-Level | 686 | 800 | Left | 134 |
| D | Top of Stack | 813 | 800 | Left | 119 |

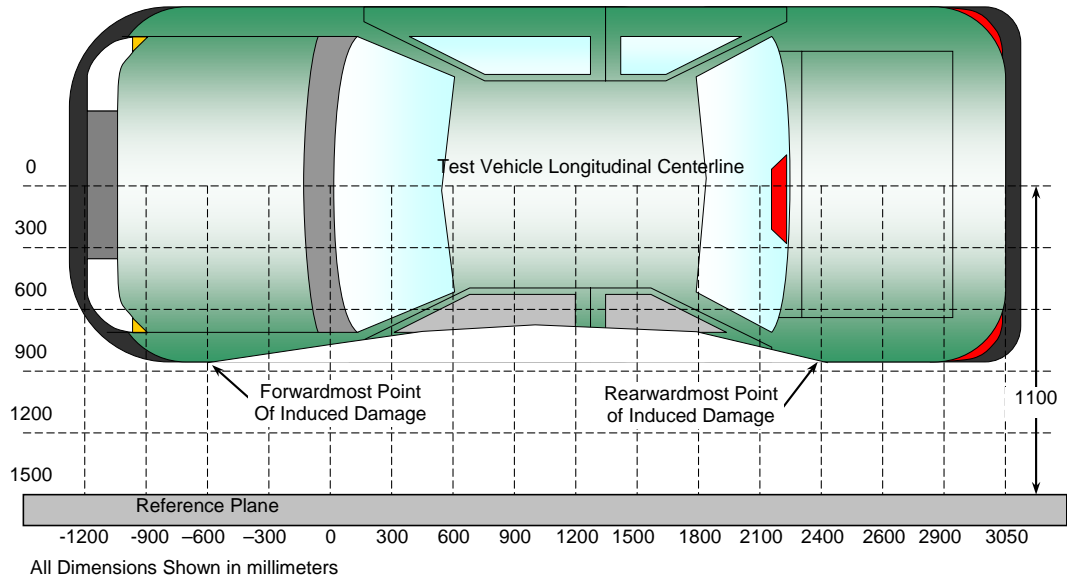
DEFORMABLE BARRIER STATIC CRUSH

| Stack Level | Distance Right of Center (mm) | | | | | | | | C _L | Distance Left of Center (mm) | | | | | | | |
|-------------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|----------------|------------------------------|-----|-----|-----|-----|-----|-----|-----|
| | 800 | 700 | 600 | 500 | 400 | 300 | 200 | 100 | | 0 | 100 | 200 | 300 | 400 | 500 | 600 | 700 |
| 4 | 54 | 51 | 55 | 60 | 66 | 80 | 93 | 109 | 90 | 65 | 75 | 82 | 73 | 81 | 89 | 90 | 119 |
| 3 | 53 | 46 | 47 | 55 | 69 | 73 | 107 | 85 | 65 | 45 | 39 | 35 | 39 | 48 | 61 | 80 | 134 |
| 2 | 147 | 145 | 139 | 134 | 115 | 100 | 103 | 105 | 110 | 109 | 118 | 119 | 119 | 117 | 117 | 124 | 134 |
| 1 | 200 | 202 | 199 | 197 | 194 | 193 | 194 | 193 | 200 | 192 | 191 | 193 | 198 | 190 | 191 | 195 | 206 |

**DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES**

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
Test Date: 10/20/2017



TOP VIEW

VEHICLE DAMAGE PROFILE DISTANCES

| DPD | Distance from Impact Point (mm) | Level | Post-Test (mm) | Pre-Test (mm) | Max. Static Crush (mm) |
|-----|---------------------------------|-------|----------------|---------------|------------------------|
| 1 | 1650 | 3 | 241 | 200 | 41 |
| 2 | 1334 | 3 | 348 | 221 | 127 |
| 3 | 960 | 3 | 307 | 211 | 96 |
| 4 | 585 | 3 | 368 | 210 | 158 |
| 5 | 211 | 3 | 355 | 211 | 144 |
| 6 | -164 | 3 | 241 | 219 | 22 |

MDB DAMAGE PROFILE DISTANCES

| DPD | Distance from Impact Point (mm) | Level | Post-Test (mm) | Pre-Test (mm) | Max. Static Crush (mm) |
|-----|---------------------------------|-------|----------------|---------------|------------------------|
| 1 | 800 mm right of center | 1 | 676 | 476 | 200 |
| 2 | 480 mm right of center | 1 | 662 | 465 | 197 |
| 3 | 160 mm right of center | 1 | 654 | 461 | 193 |
| 4 | 160 mm left of center | 1 | 652 | 461 | 191 |
| 5 | 480 mm left of center | 1 | 660 | 465 | 195 |
| 6 | 800 mm left of center | 1 | 682 | 476 | 206 |

DATA SHEET NO. 14
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

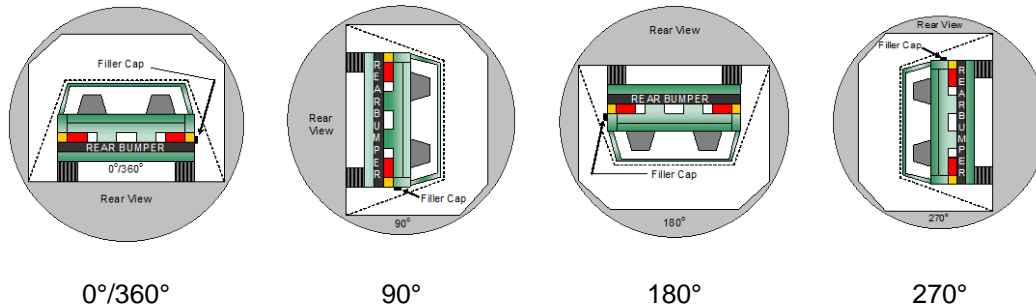
NHTSA No. M20185105
 Test Date: 10/20/2017

Test Time: 2:48 pm

Temperature: 22.1 °C

- A. From impact until vehicle motion ceases: 0.0 oz.
 (Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0.0 oz.
- C. For the following 25 minutes: None
 (Maximum Allowable = 1 ounce / minute)
- D. Spillage Details: None

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

| Test Phase | Rotation Time | Hold Time | Total Time |
|--------------|---------------|-----------|------------|
| 0° to 90° | 95 | 300 | 395 |
| 90° to 180° | 89 | 300 | 389 |
| 180° to 270° | 83 | 300 | 383 |
| 270° to 360° | 89 | 300 | 389 |

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

| Test Phase | First 5 Minutes | Sixth Minute | Seventh Minute | Eighth Minute |
|--------------|-----------------|--------------|----------------|---------------|
| 0° to 90° | 0.0 | 0.0 | 0.0 | |
| 90° to 180° | 0.0 | 0.0 | 0.0 | |
| 180° to 270° | 0.0 | 0.0 | 0.0 | |
| 270° to 360° | 0.0 | 0.0 | 0.0 | |

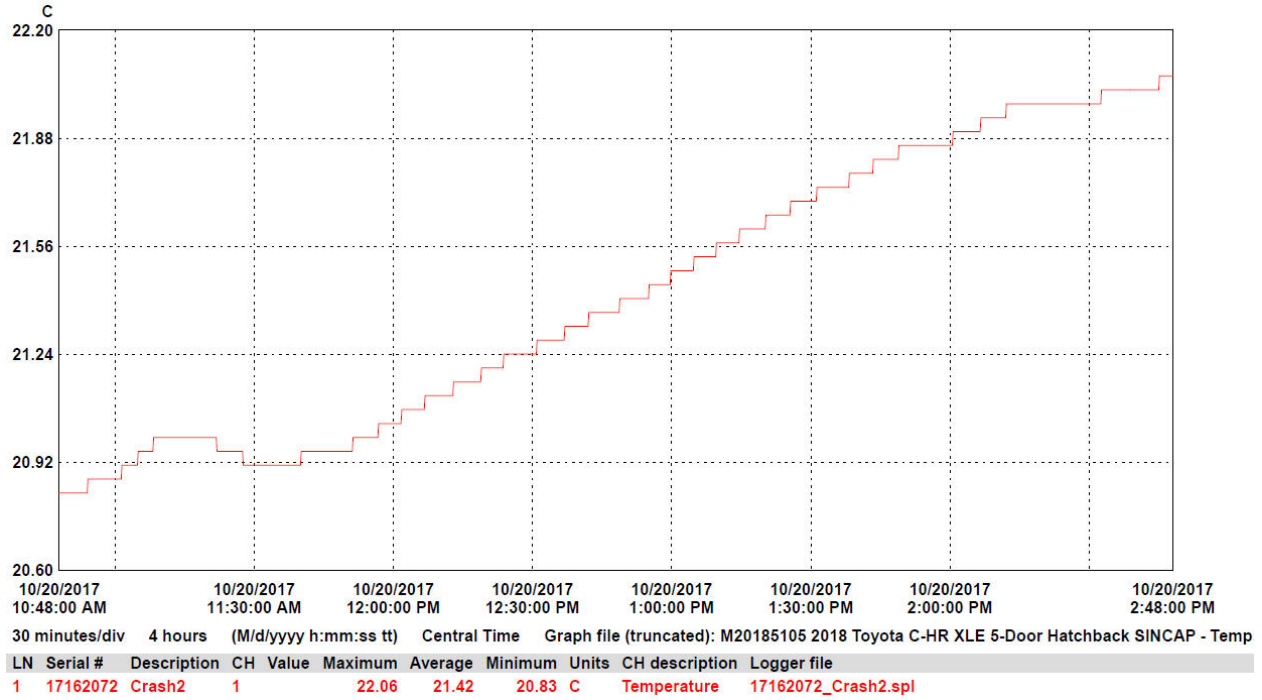
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

| Test Phase | Spillage Location |
|--------------|-------------------|
| 0° to 90° | |
| 90° to 180° | |
| 180° to 270° | |
| 270° to 360° | |

DATA SHEET NO. 15
DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2018 Toyota C-HR XLE 5-Door Hatchback
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20185105
 Test Date: 10/20/2017



**APPENDIX A
PHOTOGRAPHS**

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Photo No. 001 - As Delivered Right Front Three-Quarter View of Test Vehicle



Photo No. 002 - As Delivered Left Rear Three-Quarter View of Test Vehicle

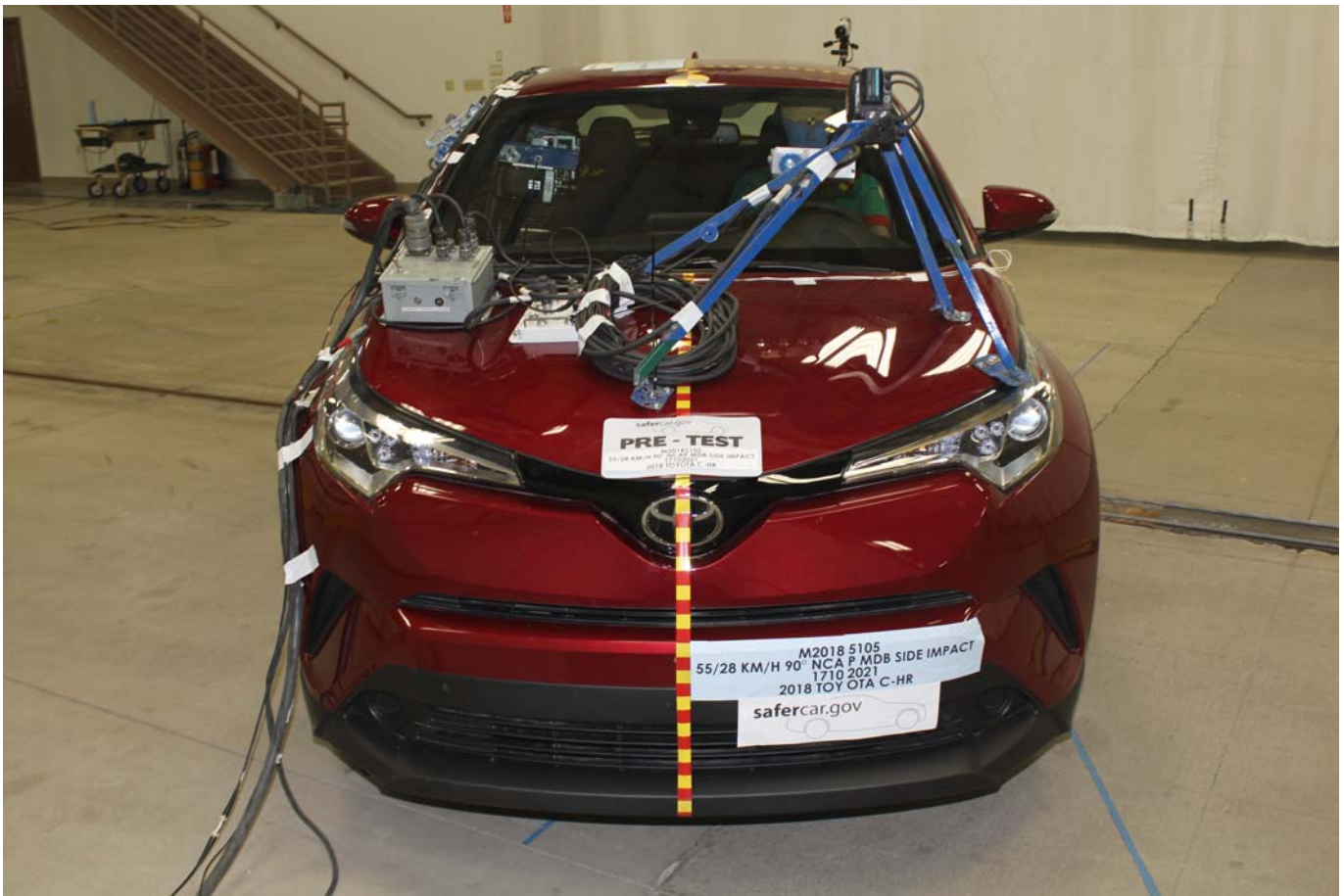


Photo No. 003 - Pre-Test Frontal View of Test Vehicle

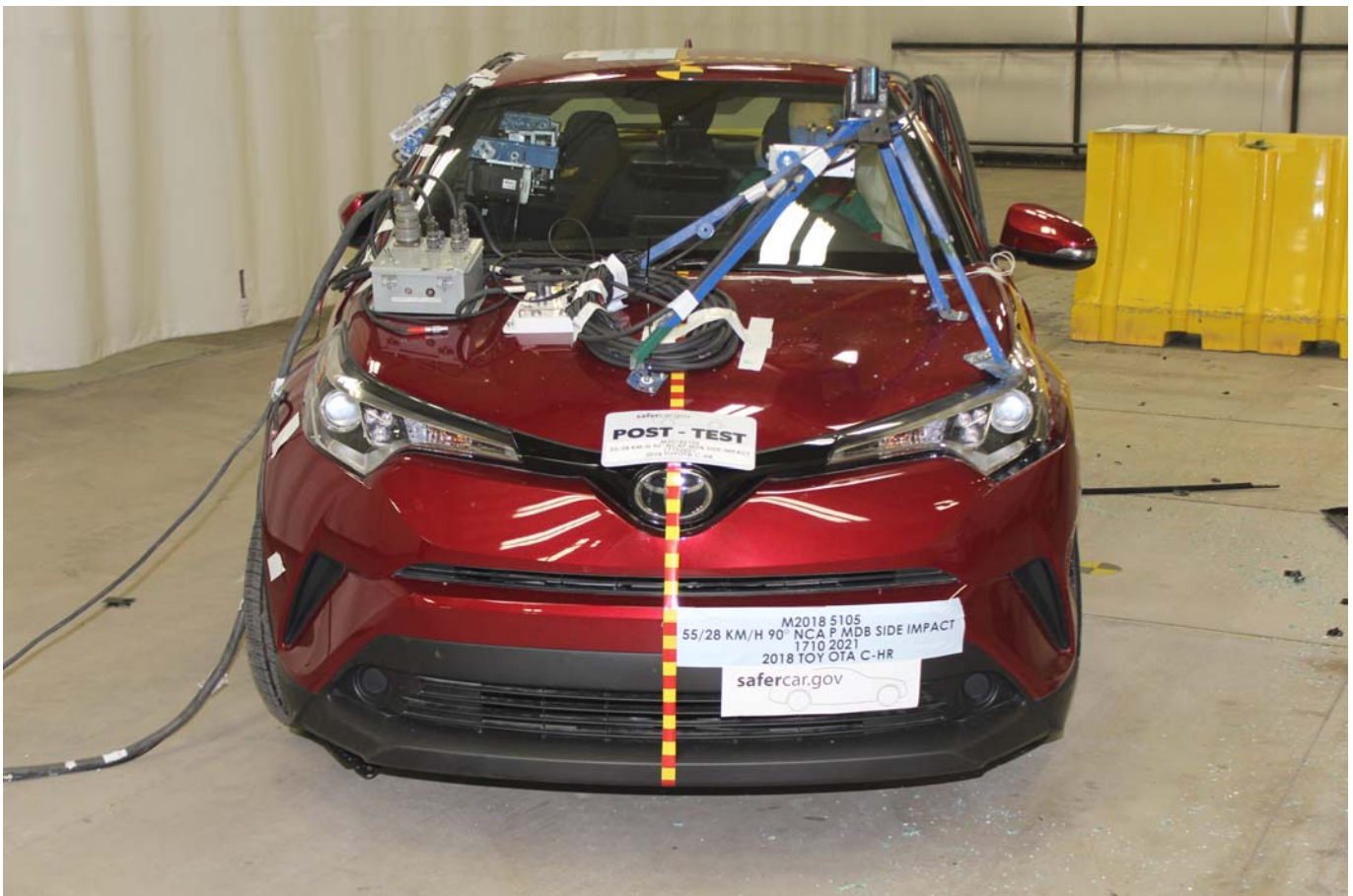


Photo No. 004 - Post-Test Frontal View of Test Vehicle



Photo No. 005 - Pre-Test Left Front Three-Quarter View of Test Vehicle



Photo No. 006 - Post-Test Left Front Three-Quarter View of Test Vehicle



Photo No. 007 - Pre-Test Left Side View of Test Vehicle



Photo No. 008 - Post-Test Left Side View of Test Vehicle



Photo No. 009 - Pre-Test Left Three-Quarter Rear View of Test Vehicle



Photo No. 010 - Post-Test Left Three-Quarter Rear View of Test Vehicle



Photo No. 011 - Pre-Test Rear View of Test Vehicle



Photo No. 012 - Post-Test Rear View of Test Vehicle



Photo No. 013 - Pre-Test Right Side View of Test Vehicle



Photo No. 014 - Post-Test Right Side View of Test Vehicle

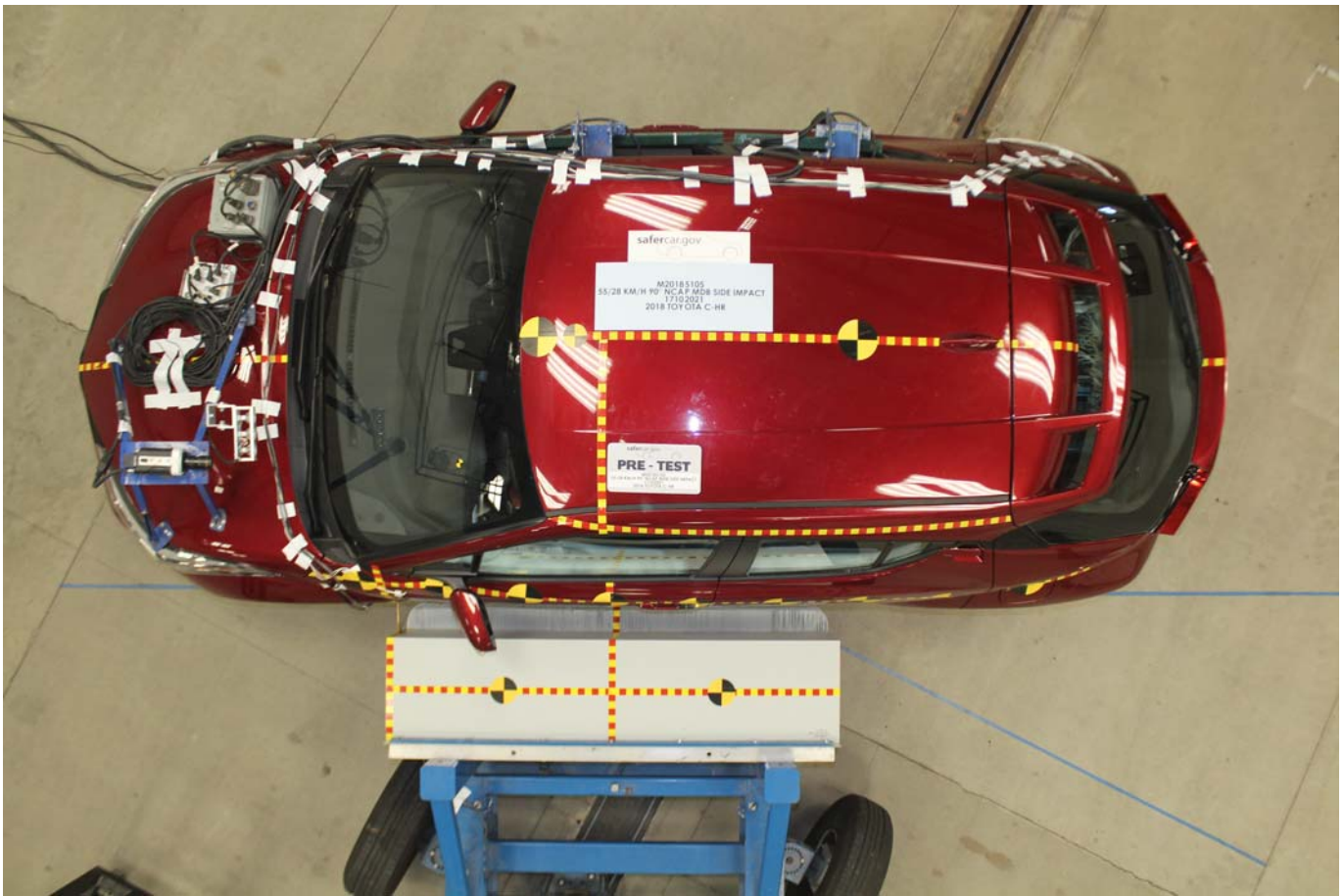


Photo No. 015 - Pre-Test Overhead View of Test Area

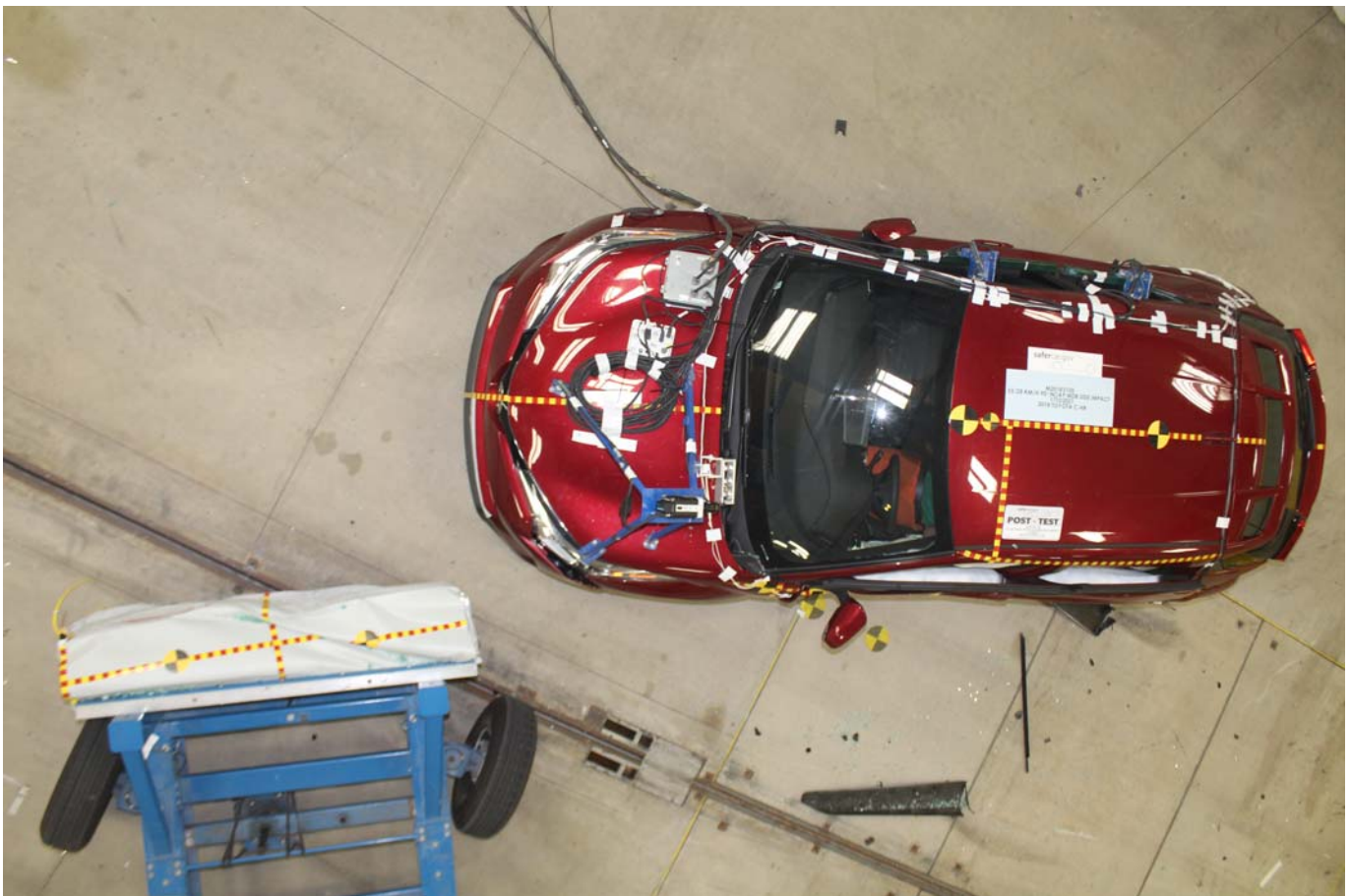


Photo No. 016 - Post-Test Overhead View of Test Area

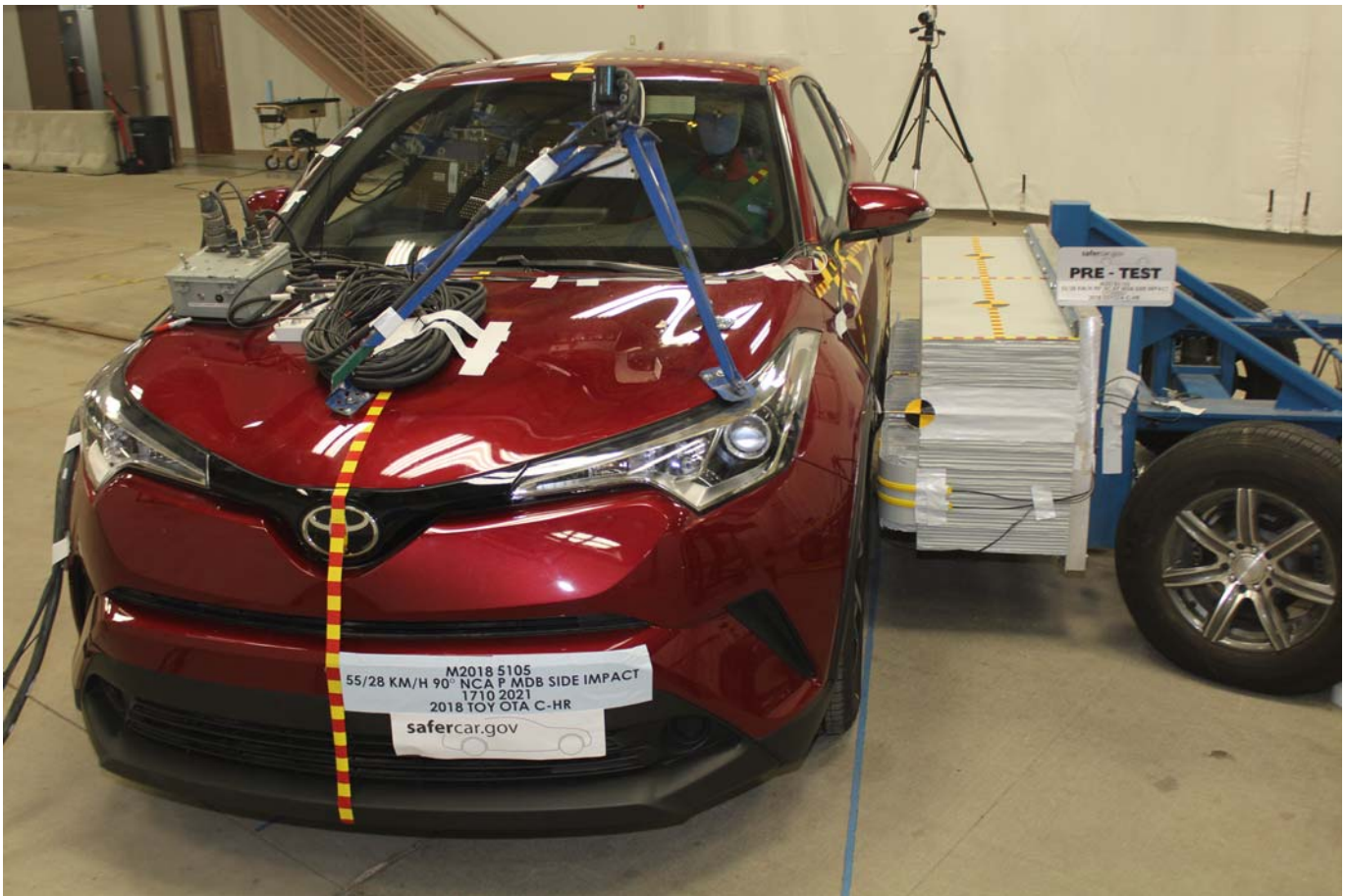


Photo No. 017 - Pre-Test Left Side View of MDB Positioned Against Side of Test Vehicle



Photo No. 018 - Pre-Test Right Side View of MDB Positioned Against Side of Test Vehicle



Photo No. 019 - Pre-Test Close-Up View of Impact Point Target



Photo No. 020 - Post-Test Close-Up View of Impact Point Target



Photo No. 021 - Pre-Test Left Front Door Latch Close-Up



Photo No. 022 - Post-Test Left Front Door Latch Close-Up



Photo No. 023 - Pre-Test Left Rear Door Latch Close-Up

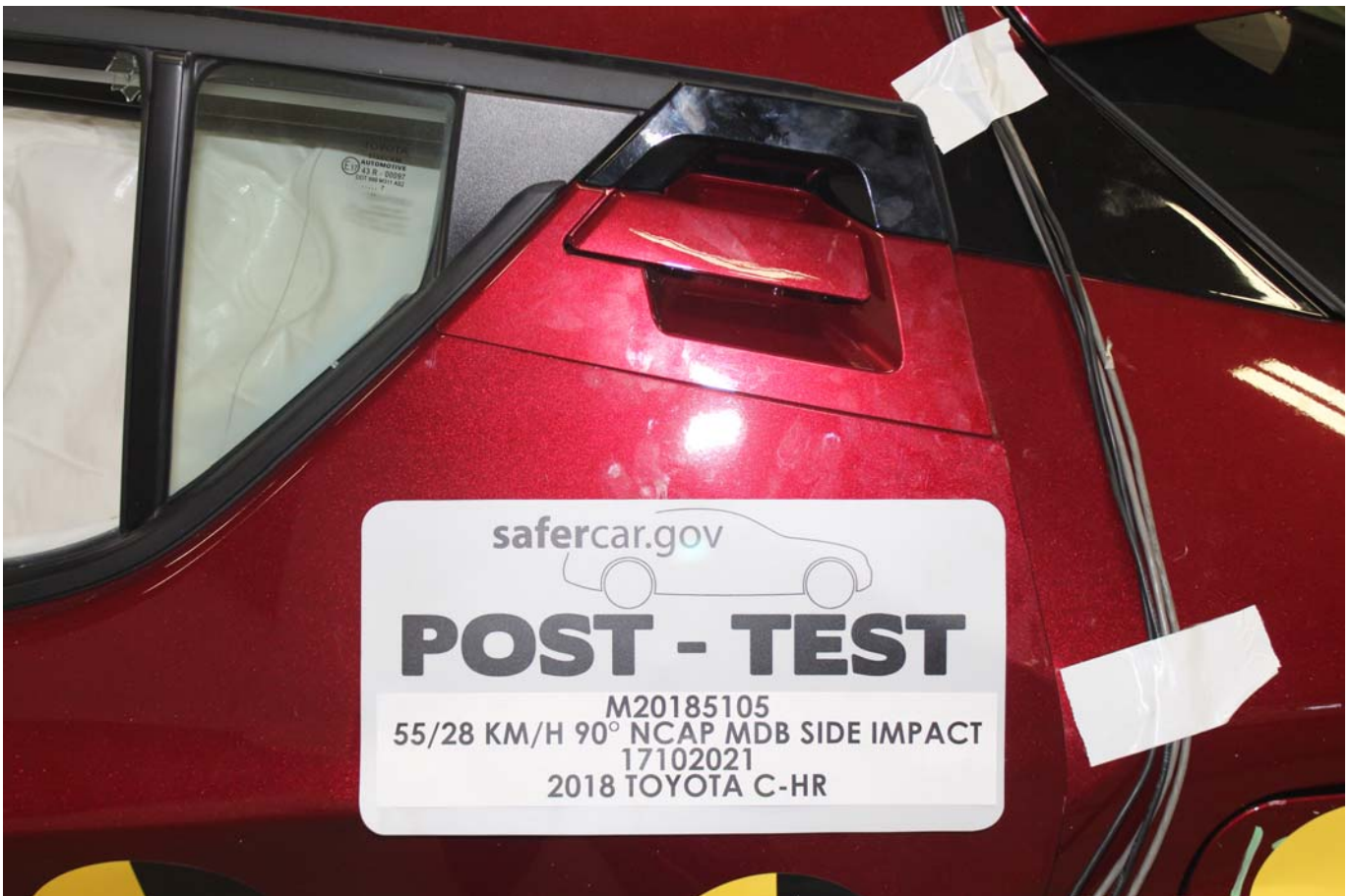


Photo No. 024 - Post-Test Left Rear Door Latch Close-Up



Photo No. 025 - Pre-Test Front Close-Up View of Driver Dummy



Photo No. 026 - Post-Test Front Close-Up View of Driver Dummy



Photo No. 027 - Pre-Test Left Side View of Driver Dummy Showing Belt and Chalking



Photo No. 028 - Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View

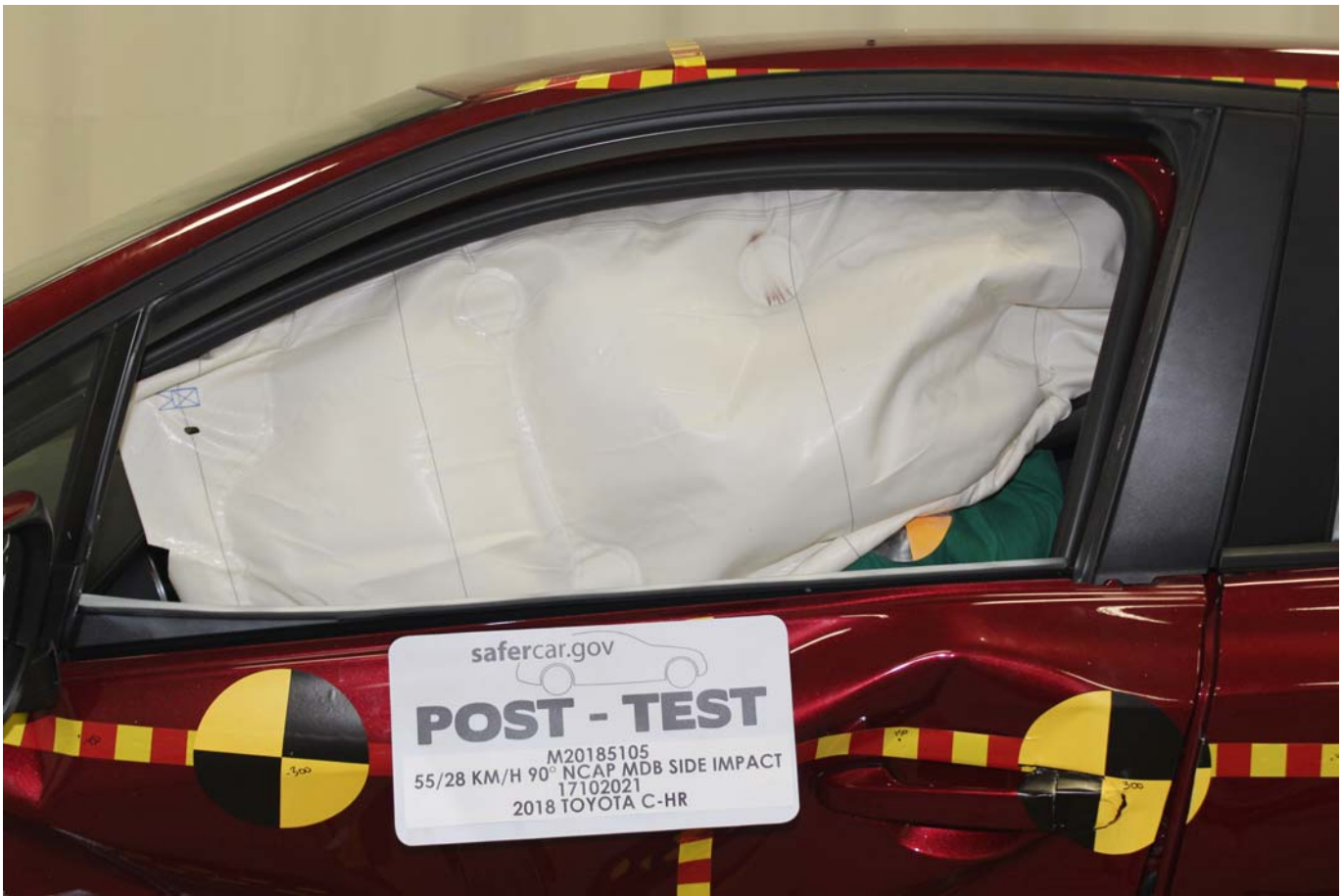


Photo No. 029 - Post-Test Left Side View of Driver Dummy Shoulder and Door Top View



Photo No. 030 - Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



Photo No. 031 - Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



Photo No. 032 - Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning



Photo No. 033 - Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



Photo No. 034 - Pre-Test Placement of Driver Dummy Feet



Photo No. 035 - Pre-Test View of Belt Anchorage for Driver Dummy



Photo No. 036 - Pre-Test Left Side View of Steering Wheel



Photo No. 037 - Pre-Test View of Disengaged Parking Brake



Photo No. 038 - Pre-Test View of Parking Brake



Photo No. 039 - Pre-Test Close-Up Left Side View of Driver Seat Track



Photo No. 040 - Pre-Test Close-Up Left Side View of Driver Seat Back



Photo No. 041 - Pre-Test Close-Up View of Driver Seat Back or Head Restraint

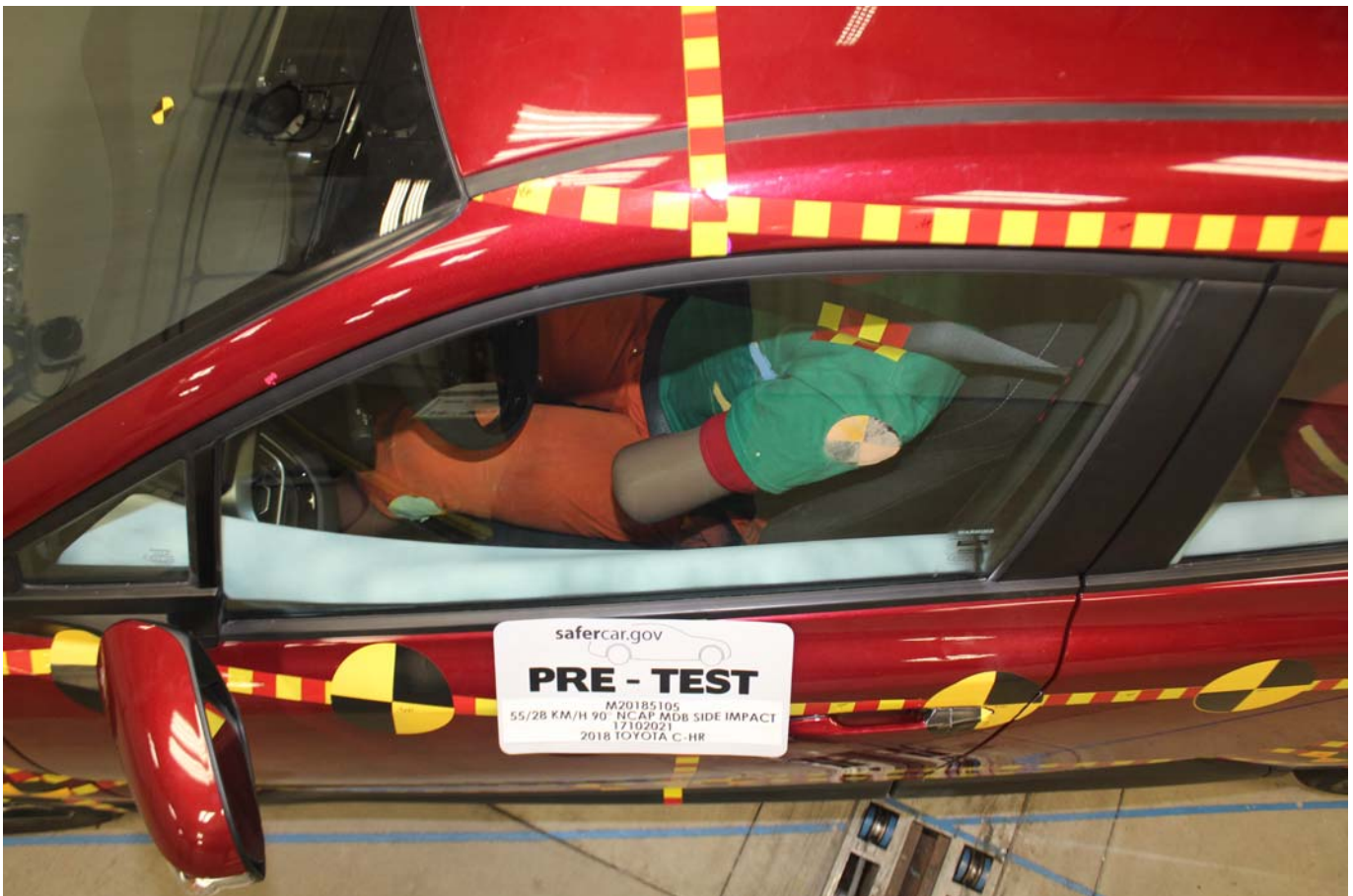


Photo No. 042 - Pre-Test Driver Dummy and Door Clearance View



Photo No. 043 - Post-Test Driver Dummy and Door Clearance View



Photo No. 044 - Pre-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



Photo No. 045 - Post-Test Right Side View of Driver Dummy and Front Seat of Occupant Compartment



Photo No. 046 - Pre-Test Driver Inner Door Panel View



Photo No. 047 - Post-Test Driver Inner Door Panel View



Photo No. 048 - Post-Test Driver Dummy Close-up Head Contact with Vehicle Interior View



Photo No. 049 - Post-Test Driver Dummy Close-up Head Contact with Side Airbag View



Photo No. 050 - Post-Test Driver Dummy Close-up Torso Contact with Vehicle Interior View



Photo No. 051 - Post-Test Driver Dummy Close-up Torso Contact with Side Airbag View



Photo No. 052 - Post-Test Driver Dummy Close-up Pelvis Contact with Vehicle Interior View



Photo No. 053 - Post-Test Driver Dummy Close-up Pelvis Contact with Side Airbag View



Photo No. 054 - Post-Test Driver Dummy Close-up Knee Contact View



Photo No. 055 - Pre-Test Left Side View of Rear Passenger Dummy Showing Belt and Chalking



Photo No. 056 - Pre-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



Photo No. 057 - Post-Test Left Side View of Rear Passenger Dummy Shoulder and Door Top View



Photo No. 058 - Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning



Photo No. 059 - Pre-Test Frontal View of Rear Passenger Dummy Head and Shoulders in Relation to Head Restraint



Photo No. 060 - Pre-Test Overhead View of Rear Passenger Seat Pan Prior to Dummy Positioning



Photo No. 061 - Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



Photo No. 062 - Pre-Test View of Rear Passenger Dummy Neck Showing Position of Adjustable Neck Bracket



Photo No. 063 - Pre-Test View of Rear Passenger Dummy Head Showing Dummy Head is Level



Photo No. 064 - Pre-Test Placement of Rear Passenger Dummy Feet



Photo No. 065 - Pre-Test View of Belt Anchorage for Rear Passenger Dummy

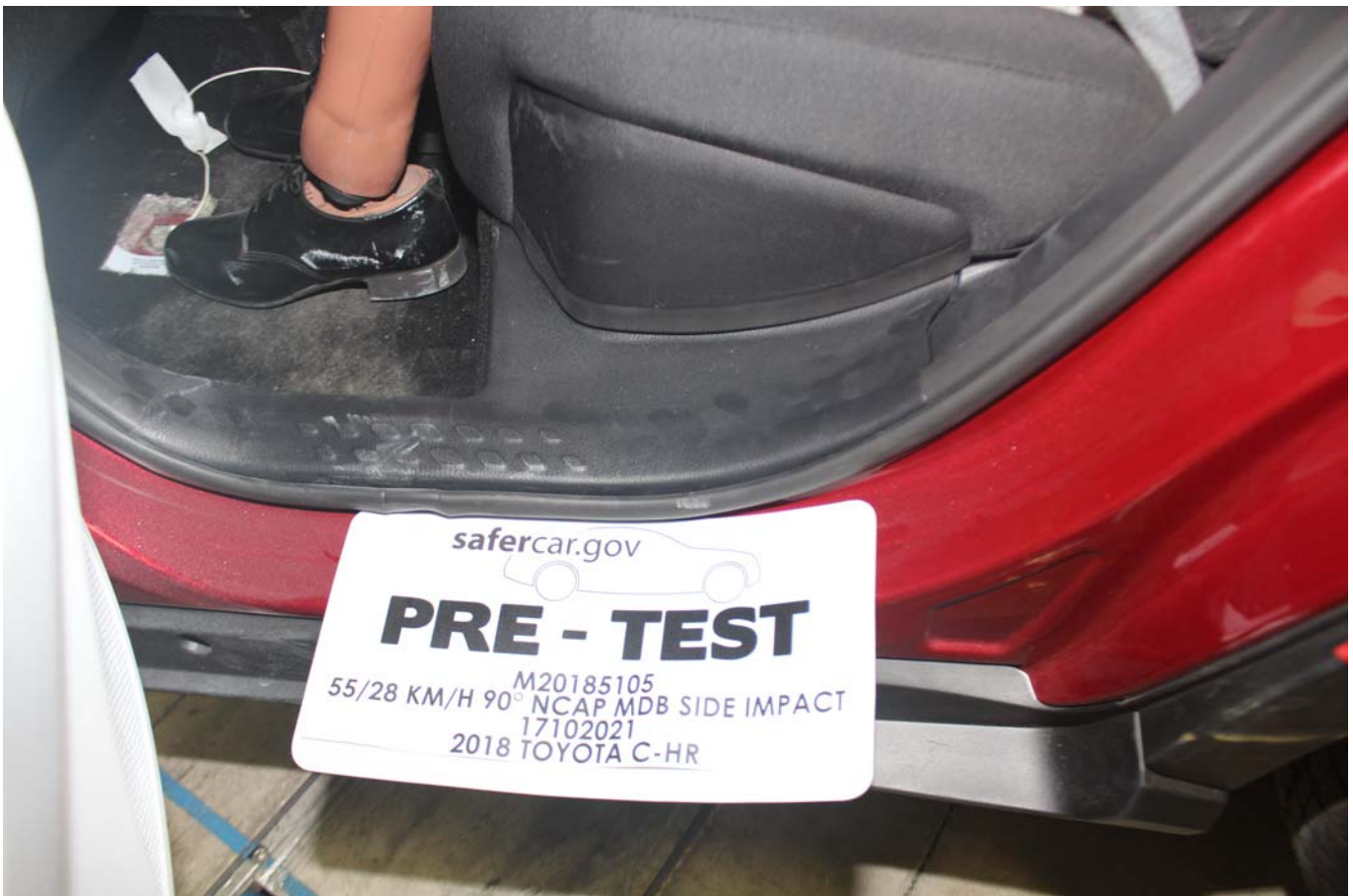


Photo No. 066 - Pre-Test Close-Up Left Side View of Rear Passenger Seat Track

PHOTOGRAPH NOT APPLICABLE

Photo No. 067 - Pre-Test Close-Up Left Side View of Rear Passenger Seat Back



Photo No. 068 - Pre-Test Close-up View of Rear Passenger Seat Back or Head Restraint



Photo No. 069 - Pre-Test Rear Passenger Dummy and Door Clearance View



Photo No. 070 - Post-Test Rear Passenger Dummy and Door Clearance View



Photo No. 071 - Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



Photo No. 072 - Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment

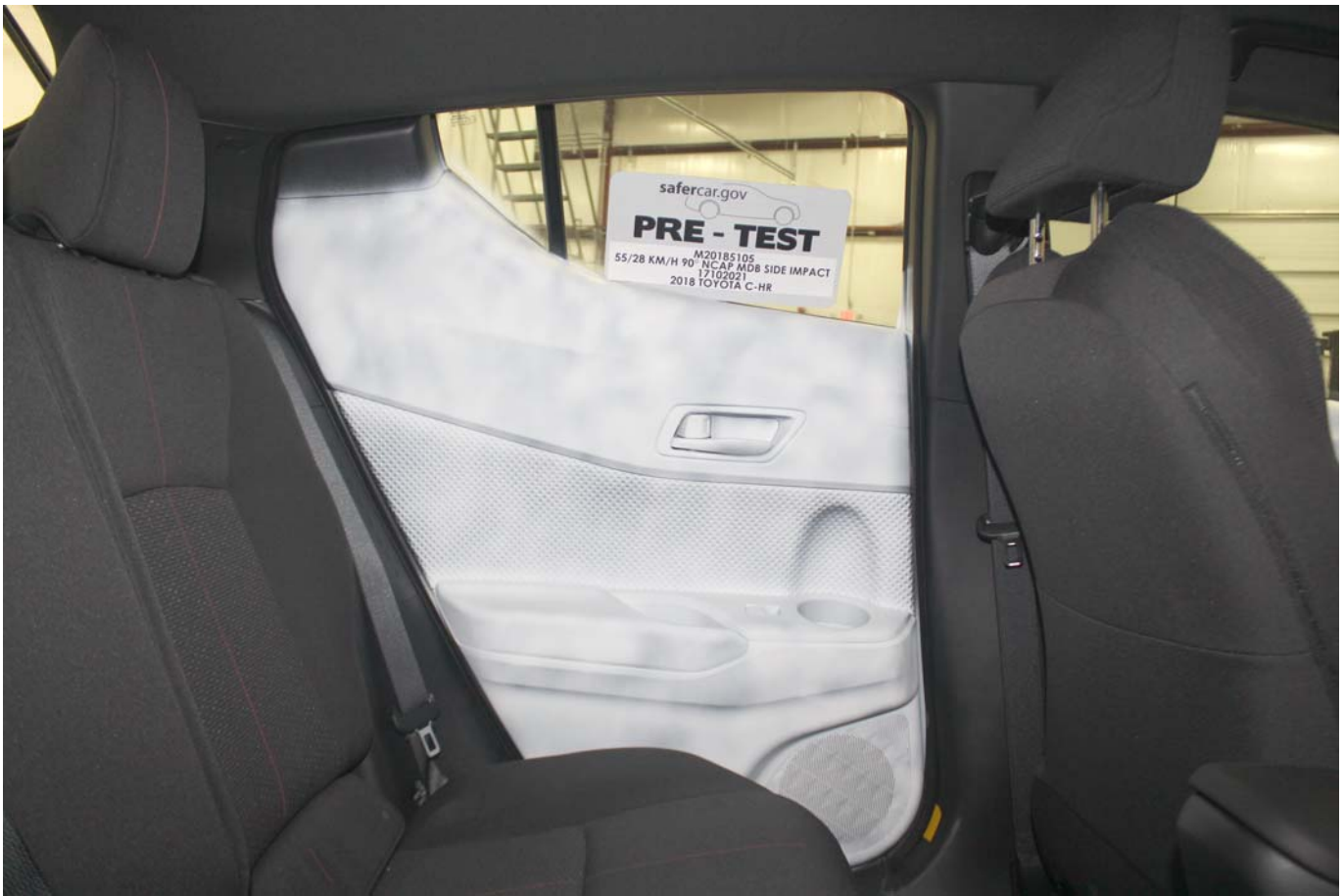


Photo No. 073 - Pre-Test Rear Passenger Inner Door Panel View



Photo No. 074 - Post-Test Rear Passenger Inner Door Panel View



Photo No. 075 - Post-Test Rear Passenger Dummy Close-up Head Contact with Vehicle Interior View



Photo No. 076 - Post-Test Rear Passenger Dummy Close-up Head Contact with Side Airbag View



Photo No. 077 - Post-Test Rear Passenger Dummy Close-up Torso Contact with Vehicle Interior View



Photo No. 078 - Post-Test Rear Passenger Dummy Close-up Torso Contact with Side Airbag View



Photo No. 079 - Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Vehicle Interior View

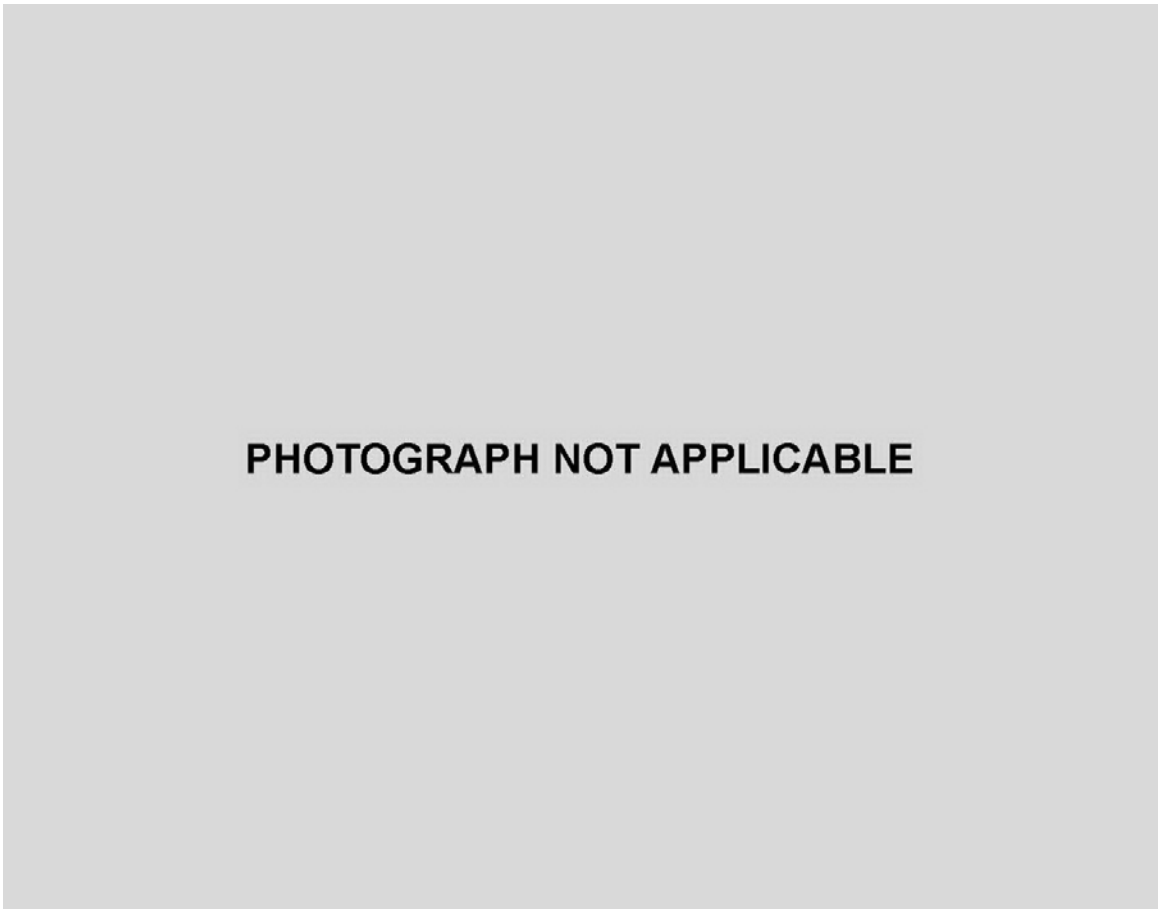


Photo No. 080 - Post-Test Rear Passenger Dummy Close-up Pelvis Contact with Side Airbag View

PHOTOGRAPH NOT APPLICABLE

Photo No. 081 - Post-Test Rear Passenger Dummy Close-up Knee Contact View



Photo No. 082 - Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Photo No. 083 - Post-Test View of Fuel Filler Cap or Fuel Filler Neck



Photo No. 084 - Pre-Test Front View of MDB Impactor Face



Photo No. 085 - Post-Test Front View of MDB Impactor Face



Photo No. 086 - Pre-Test Top View of MDB Impactor Face



Photo No. 087 - Post-Test Top View of MDB Impactor Face



Photo No. 088 - Pre-Test Left Side View of MDB Impactor Face



Photo No. 089 - Post-Test Left Side View of MDB Impactor Face



Photo No. 090 - Pre-Test Right Side View of MDB Impactor Face



Photo No. 091 - Post-Test Right Side View of MDB Impactor Face



Photo No. 092 - Close-Up View of Vehicle Certification Label



Photo No. 093 - Close-Up View of Vehicle Tire Information Placard or Label



Photo No. 093a - Close-Up View of Vehicle Load Carrying Capacity Reduction Label



Photo No. 094 - Pre-Test Ballast View



Photo No. 095 - Post-Test Primary and Redundant Speed Trap Read-Out

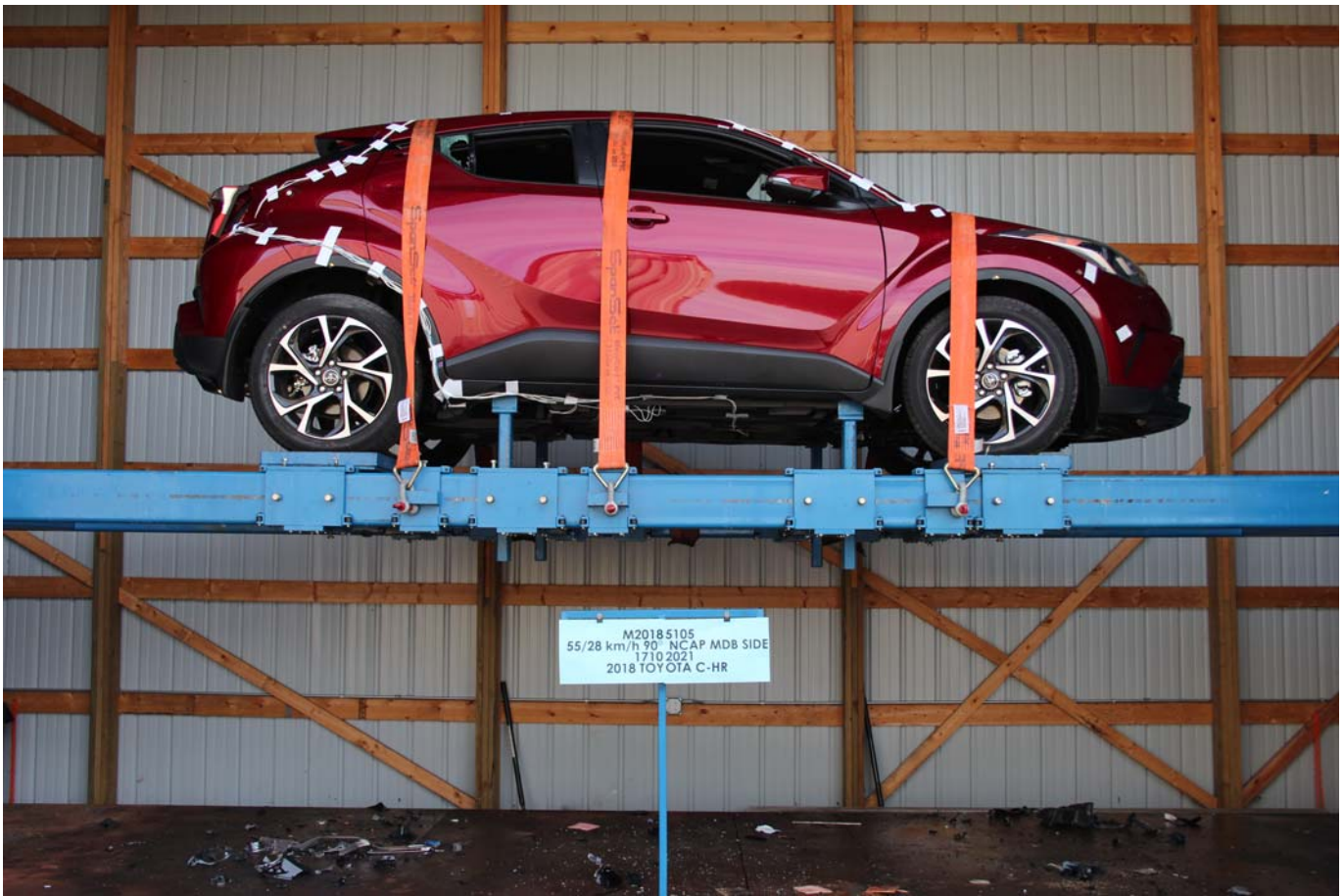


Photo No. 096 - FMVSS Photo No. 301 Static Rollover 0 Degrees

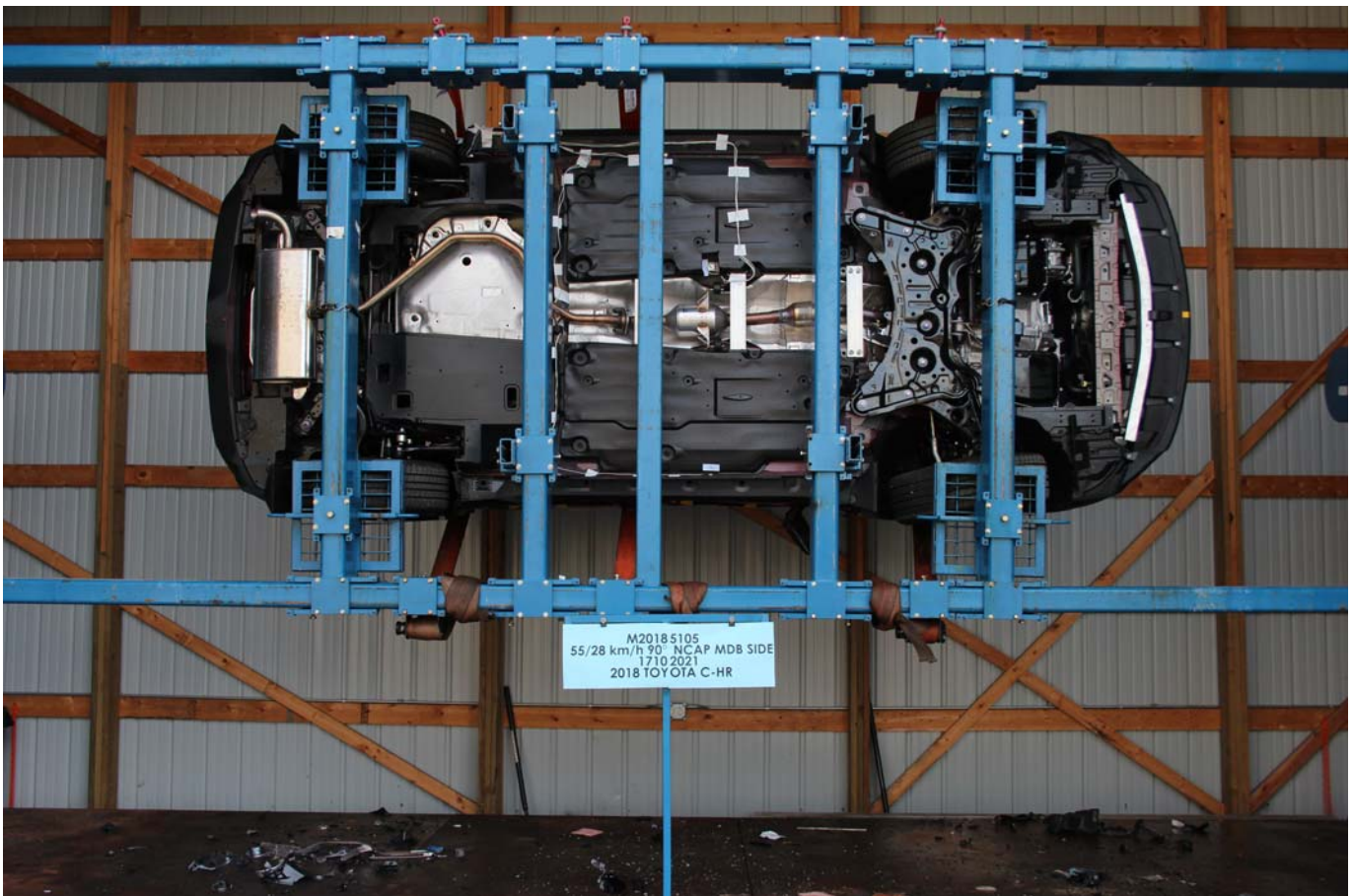


Photo No. 097 - FMVSS Photo No. 301 Static Rollover 90 Degrees



Photo No. 098 - FMVSS Photo No. 301 Static Rollover 180 Degrees



Photo No. 099 - FMVSS Photo No. 301 Static Rollover 270 Degrees

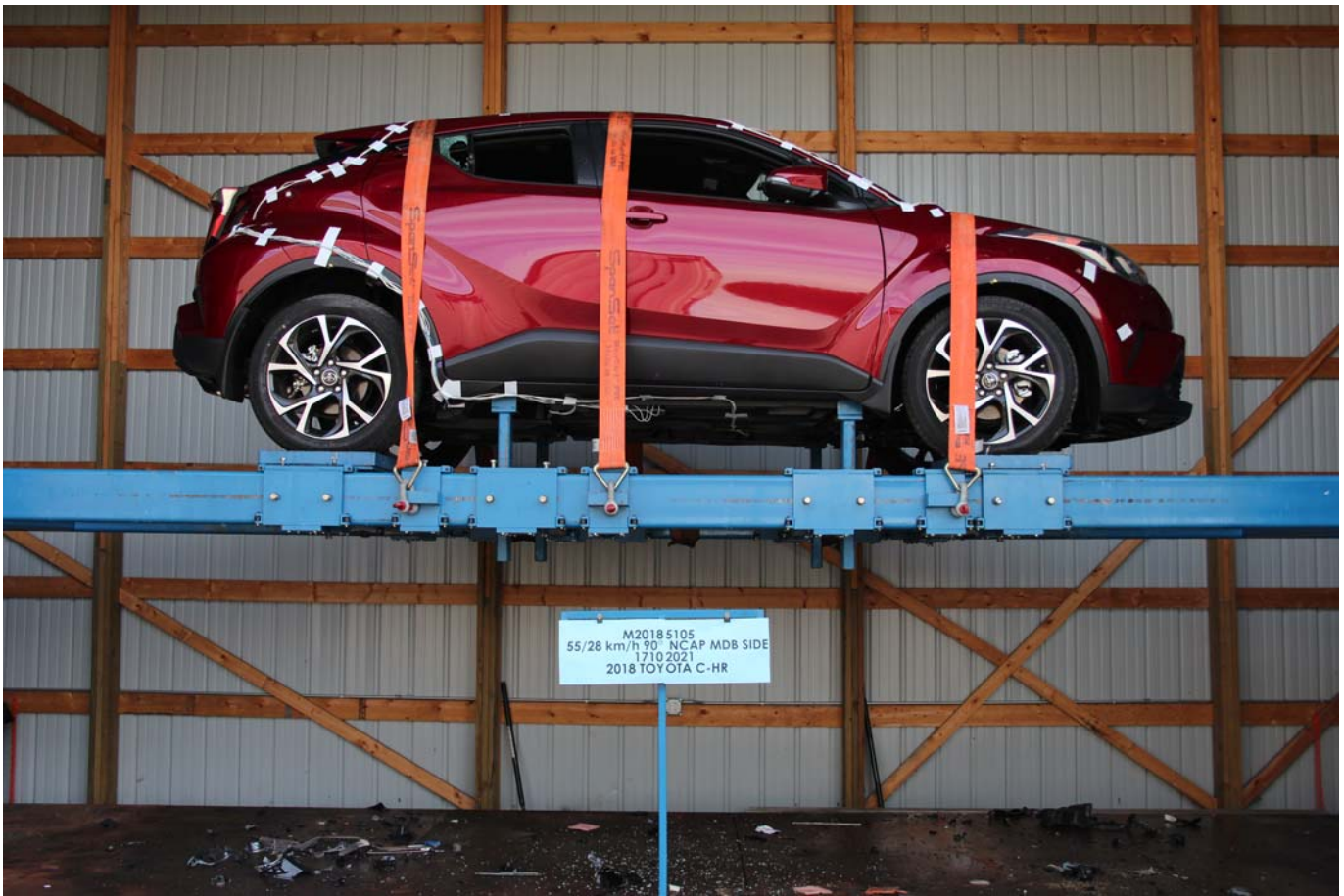


Photo No. 100 - FMVSS Photo No. 301 Static Rollover 360 Degrees



Photo No. 101 - Impact Event



DESC: **C-HR** XLE
 VIN: **NMTKHMBOX4JR007159**
 YR/MDL: 2018/2404A
 CLR: RUBY FLARE PEARL/FC20 (03T3/20)
 FINAL ASSEMBLY POINT: ARIFIYE, SAKARYA, TURKEY

GOVERNMENT 5-STAR SAFETY RATINGS

This vehicle has not been rated by the government for overall vehicle score, frontal crash, side crash or rollover risk.

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
 Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

STANDARD EQUIPMENT

MECHANICAL AND PERFORMANCE

- 2.0L 4-Cyl DOHC 16-Valve 144HP
 - CVT w/Intelligence and Shift Mode
 - Front Whl Drive; Electric Power-Assisted Steering; Electronic Fuel Injection Syst
 - Ventilated Fr Disc/Solid Rr Disc Brakes
 - Independent MacPherson Strut Front & Double Wishbone Rear Suspension
 - 18" Alloy Wheels with 225/50R18 Tires
- SAFETY AND CONVENIENCE**
- Toyota Safety Sense P: Pre-Collision System with Pedestrian Detection; Lane Departure Alert with Steering Assist; Automatic High Beams; Full-Speed Range Dynamic Radar Cruise Control
 - Electric Parking Brake and Brake Hold
 - DrivFr Psgr Adv Airbag System, Dr Knee Airbag, DrivFr Psgr & Rr Seat-Mounted Side Airbags, Fr/Rr Side Curtain Airbags, Fr Psgr Seat Cushion Airbag
 - Auto-Stirring Review Mirr w/Backup Camera
 - LATCH-Lower Anchor & Tether for Children
 - Tire Pressure Monitoring System

EXTERIOR

- Proj-Bm Halogen Hdamps w/Auto On/Off
- LED Daytime Running Lights w/On/Off
- Rear Window Wiper & Defogger
- Color-Keyed Pwr Duts Mirrs w/Turn Sig Ind
- Variable & Intermit Fr Windshield Wipers

INTERIOR

- 7" Touch-Screen Display Audio, AM/FM/HD Radio w/Ana,8 Spkrs,AUX/USB Ports w/iPod Connectivity,Hands-Free Phone Capability & Music Streaming via Bluetooth Wireless Technology, Voice Recognition Technology
- 4.2" Color Multi-Information Display
- Dual-Zone Auto Climate Control System
- Rmte Kytss Entry w/Lock,Unlock,Panic Btn
- Pwr Locks, Pwr Windows w/One-Touch Auto Up/Down in All Positions
- Lthr Trim Trm/Teles Str WHI w/Aud, MID, BT, Voice Command, DRCC, LDA, Trip Contr
- ***Full Tank of Gas***

MANUFACTURER'S SUGGESTED RETAIL PRICE \$22,500.00

OPTIONAL EQUIPMENT

- FE 50 State Emissions 395.00
- PC Special Color 149.00
- RL All Weather Floor Liners 119.00
- RF Cargo Liner 129.00
- MG Mudguards

EPA DOT Fuel Economy and Environment Gasoline Vehicle

Fuel Economy
29 MPG
 combined city/hwy
 27 city 31 highway
 3.4 gallons per 100 miles

You save \$500
 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$1,250

Fuel Economy & Greenhouse Gas Rating 6 (out of 10, Best)

Smog Rating 3 (out of 10, Best)

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 27 MPG and costs \$1,250 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.40 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov
 Calculate personalized estimates and compare vehicles

Smartphone QR Code

DELIVERY PROCESSING AND HANDLING FEE 960.00

TOTAL \$24,252.00

The New Vehicle Limited Warranty provides 3-year/50,000-mile basic coverage, 5-year/60,000-mile powertrain coverage, plus 5-year/unlimited-mile corrosion perforation coverage. See Warranty and Maintenance Guide for details. An extended service contract may be available for the vehicle. Ask dealer for details. Manufacturer's suggested retail price includes manufacturer's recommended pre-delivery service. Gasoline, license and title fees, applicable federal, state and local taxes and dealer and distributor installed options and accessories are not included in the manufacturer's suggested retail price. ToyotaCare, which covers normal factory scheduled maintenance for two years or 25,000 miles, whichever occurs first, is included as part of the sales price of the vehicle for qualifying buyers. See participating dealer for eligibility and coverage details.

Delivered by Truck to: 48065
 TOYOTA OF BROOKFIELD
 20655 WEST CAPITOL DR
 BROOKFIELD WIS3045



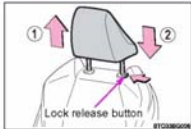
Photo No. 102 - Monroney Label

Head restraints

Head restraints are provided for all seats.

Front seats

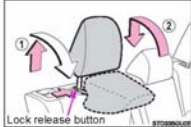
- Up
Pull the head restraints up.
- Down
Push the head restraint down while pressing the lock release button.



Rear seats

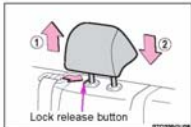
Rear outboard seats

- To fold
Pull the head restraint up while pressing the lock release button.
- To use
Lift up and push down the head restraint to the lowest lock position.



Rear center seat

- Up
Pull the head restraints up.
- Down
Push the head restraint down while pressing the lock release button.

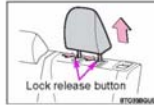


Removing the head restraints

- Front seats and rear center seat
Pull the head restraint up while pressing the lock release button.



- Rear outside seats
Pull the head restraint up while pressing the both lock release buttons.

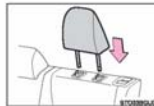


Installing the head restraints

- Front seats and rear center seat
Align the head restraint with the installation holes and push it down to the lock position. Press and hold the lock release button when lowering the head restraint.



- Rear outside seats
Align the head restraint with the installation holes and push it down to the lock position.



3 Operation of each component

Adjusting the height of the front seat head restraints

Make sure that the head restraints are adjusted so that the center of the head restraint is closest to the top of your ears.



- Adjusting the rear center seat head restraint
Always raise the head restraint one level from the stowed position when using.

WARNING

- Head restraint precautions**
Observe the following precautions regarding the head restraints. Failure to do so may result in death or serious injury.
 - Use the head restraints designed for each respective seat.
 - Adjust the head restraints to the correct position at all times.
 - After adjusting the head restraints, push down on them and make sure they are locked in position.
 - Do not drive with the head restraints removed.

Photo No. 103 - Head Restraint Use and Adjustment Information from Vehicle Owners Manual

APPENDIX B
DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

| <u>No.</u> | <u>Description</u> | <u>Page No.</u> |
|-------------------|---|------------------------|
| Figure No. 1. | Driver Head Acceleration (X) Primary vs. Time | B-1 |
| Figure No. 2. | Driver Head Acceleration (Y) Primary vs. Time | B-1 |
| Figure No. 3. | Driver Head Acceleration (Z) Primary vs. Time | B-1 |
| Figure No. 4. | Driver Head Resultant Acceleration Primary vs. Time | B-1 |
| Figure No. 5. | Driver Upper Thorax Rib Deflection (Y) vs. Time | B-2 |
| Figure No. 6. | Driver Middle Thorax Rib Deflection (Y) vs. Time | B-2 |
| Figure No. 7. | Driver Lower Thorax Rib Deflection (Y) vs. Time | B-2 |
| Figure No. 8. | Driver Thorax Rib Deflection Maximum vs. Time | B-2 |
| Figure No. 9. | Driver Anterior Abdomen Force (Y) vs. Time | B-3 |
| Figure No. 10. | Driver Middle Abdomen Force (Y) vs. Time | B-3 |
| Figure No. 11. | Driver Posterior Abdomen Force (Y) vs. Time | B-3 |
| Figure No. 12. | Driver Total Abdominal Force (Y) vs. Time | B-3 |
| Figure No. 13. | Driver Pubic Symphysis Force (Y) vs. Time | B-4 |
| Figure No. 14. | Passenger Head Acceleration (X) Primary vs. Time | B-5 |
| Figure No. 15. | Passenger Head Acceleration (Y) Primary vs. Time | B-5 |
| Figure No. 16. | Passenger Head Acceleration (Z) Primary vs. Time | B-5 |
| Figure No. 17. | Passenger Head Resultant Acceleration Primary vs. Time | B-5 |
| Figure No. 18. | Passenger Lower Spine T12 Acceleration (X) vs. Time | B-6 |
| Figure No. 19. | Passenger Lower Spine T12 Acceleration (Y) vs. Time | B-6 |
| Figure No. 20. | Passenger Lower Spine T12 Acceleration (Z) vs. Time | B-6 |
| Figure No. 21. | Passenger Lower Spine T12 Resultant Acceleration vs. Time | B-6 |
| Figure No. 22. | Passenger Iliac Force on Impact Side (Y) vs. Time | B-7 |
| Figure No. 23. | Passenger Acetabulum Force on Impact Side (Y) vs. Time | B-7 |
| Figure No. 24. | Passenger Total Pelvic Force on Impact Side (Y) vs. Time | B-7 |

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at www.NHTSA.dot.gov

Additional Driver & Passenger Dummy Instrumentation Data

Passenger Head Angular Velocity (X)
Passenger Head Angular Velocity (Y)
Passenger Head Angular Velocity (Z)
Driver Lower Spine T12 Acceleration (X)
Driver Lower Spine T12 Acceleration (Y)
Driver Lower Spine T12 Acceleration (Z)
Passenger Upper Thorax Rib Deflection (Y)
Passenger Middle Thorax Rib Deflection (Y)
Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower Abdomen Rib Deflection (Y)
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Passenger Head Acceleration Redundant (X)
Passenger Head Acceleration Redundant (Y)
Passenger Head Acceleration Redundant (Z)

Vehicle Instrumentation Data

Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (X)
Right Side Sill at Rear Seat Acceleration (Y)
Right Side Sill at Rear Seat Acceleration (Z)
Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat Acceleration (Y)
Lower A-Post Acceleration (Y)
Middle A-Post Acceleration (Y)
Lower B-Post Acceleration (Y)
Middle B-Post Acceleration (Y)
Front Seat Track Acceleration (Y)
Rear Seat Track Acceleration (Y)
Right Rear Occupant Compartment Acceleration (Y)
Engine Block (X)
Engine Block (Y)
Rear Floorpan Above Axle Acceleration (X)
Rear Floorpan Above Axle Acceleration (Y)
Rear Floorpan Above Axle Acceleration (Z)

MDB Instrumentation Data

MDB Center of Gravity Acceleration (X)

MDB Center of Gravity Acceleration (Y)

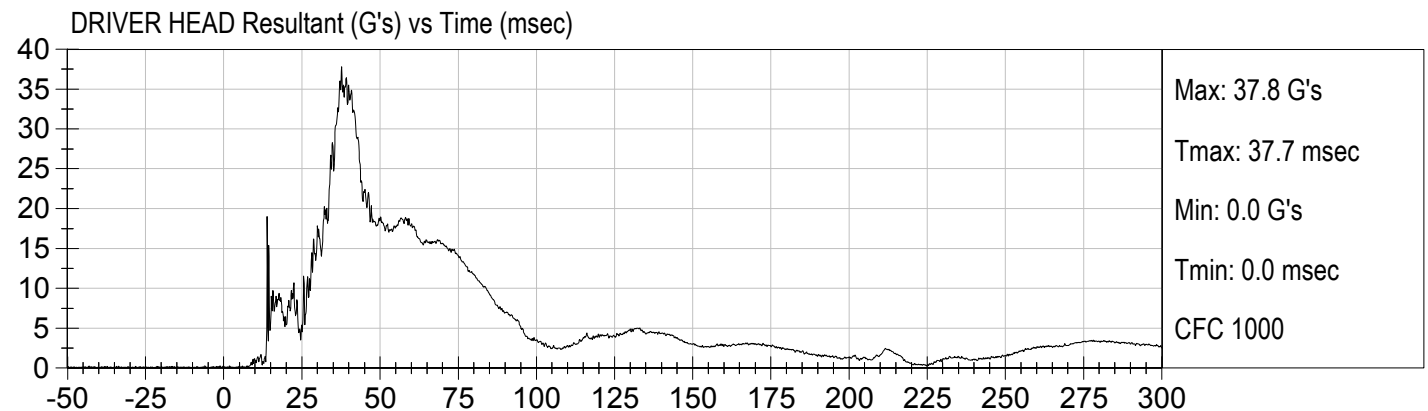
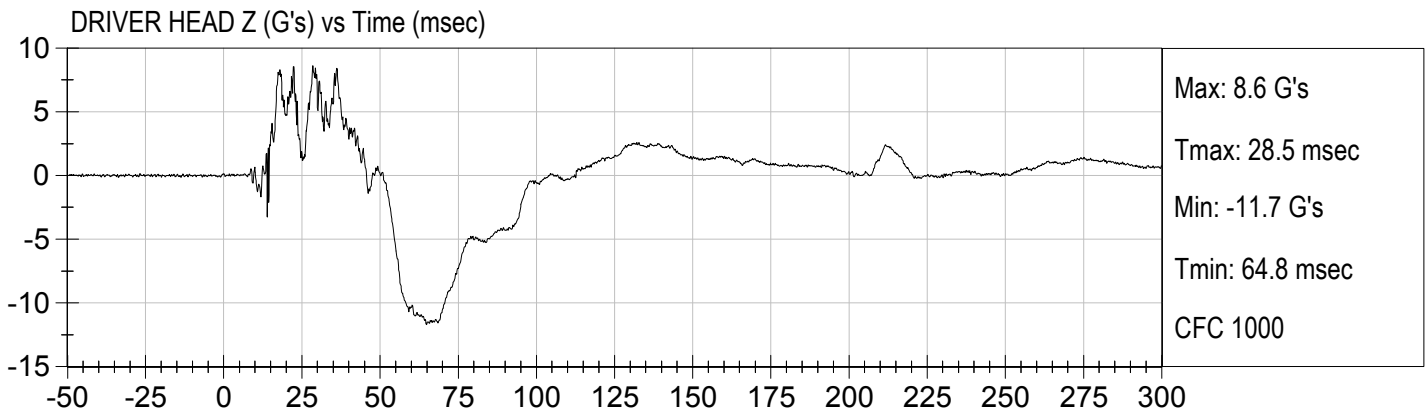
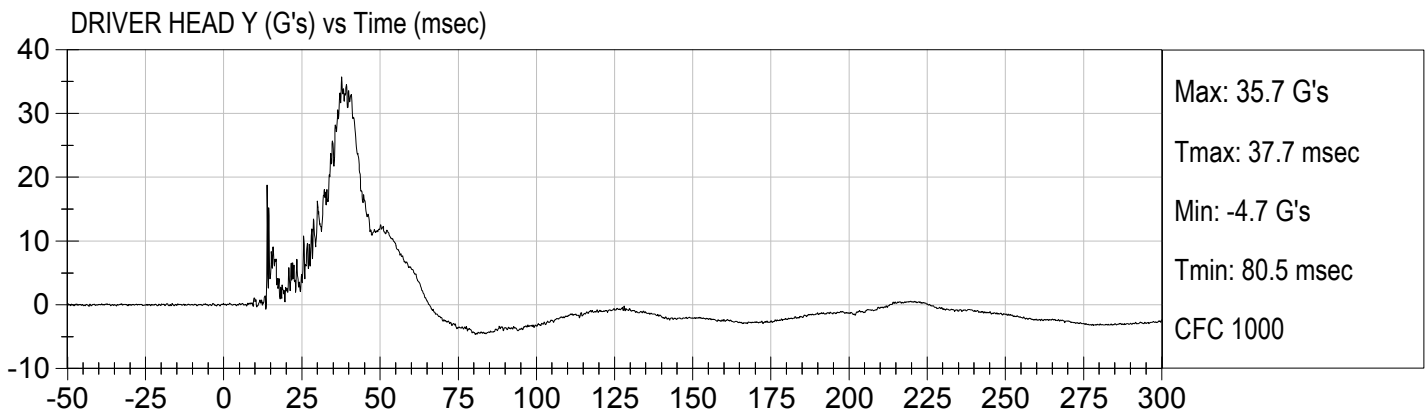
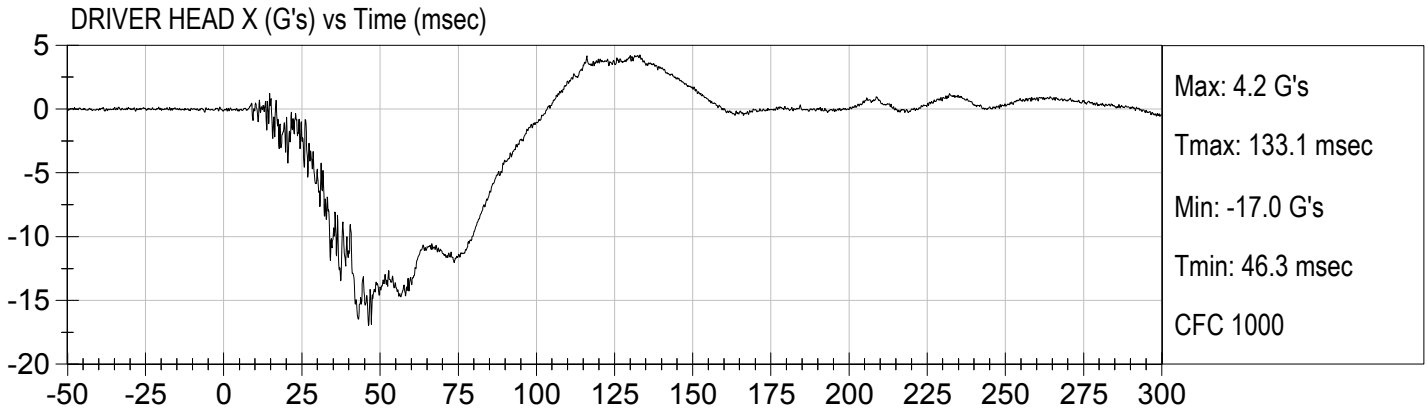
MDB Center of Gravity Acceleration (Z)

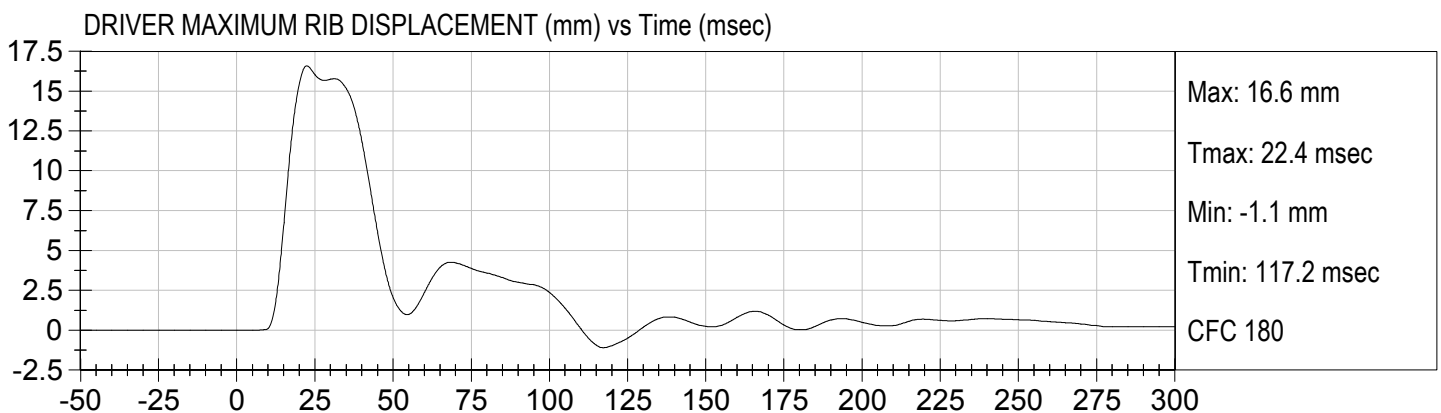
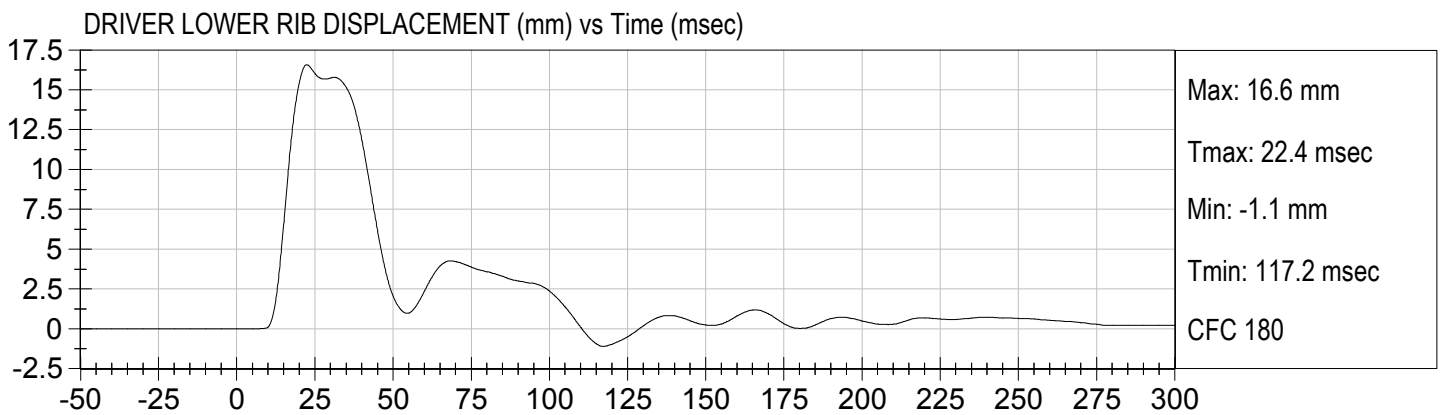
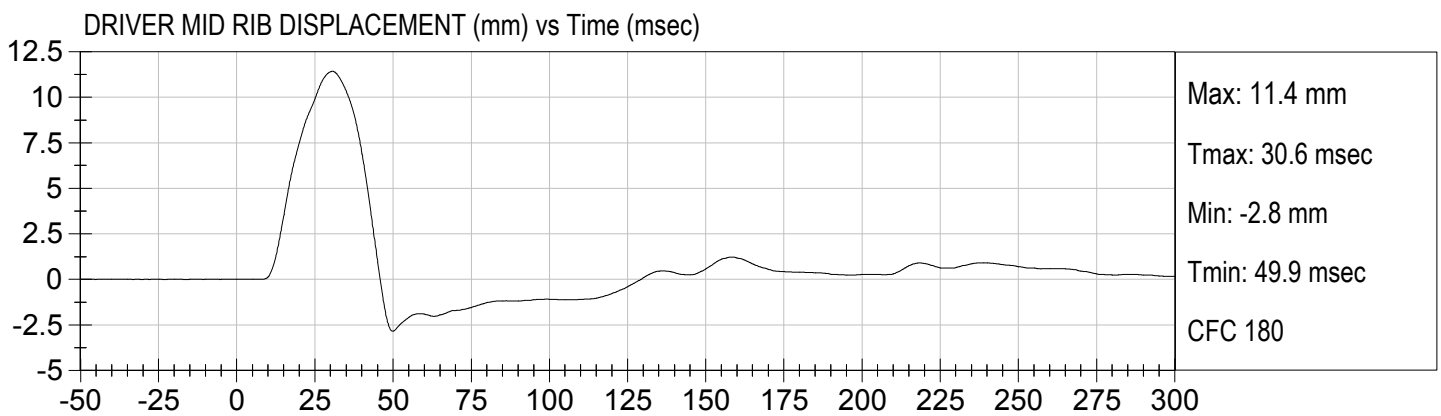
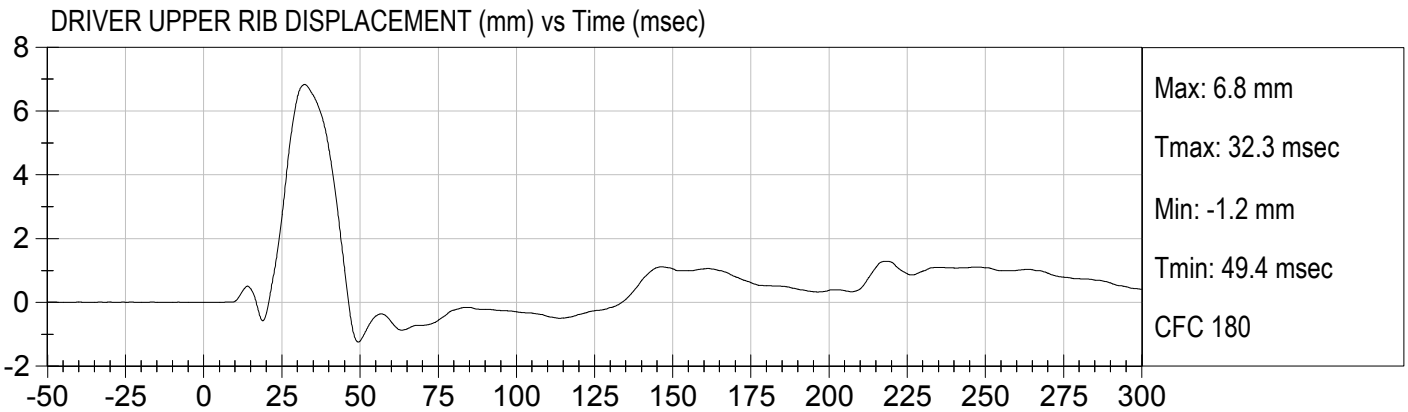
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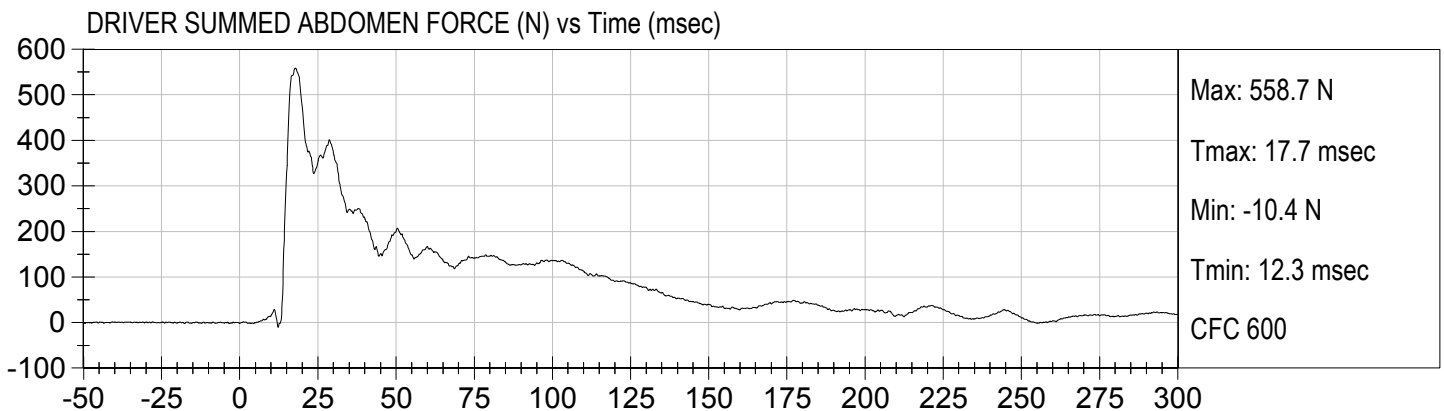
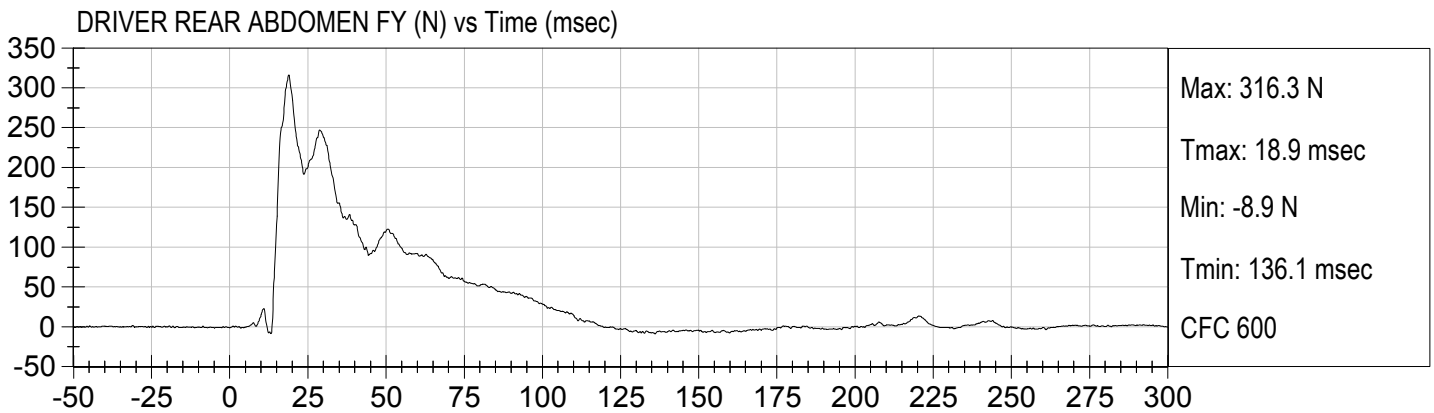
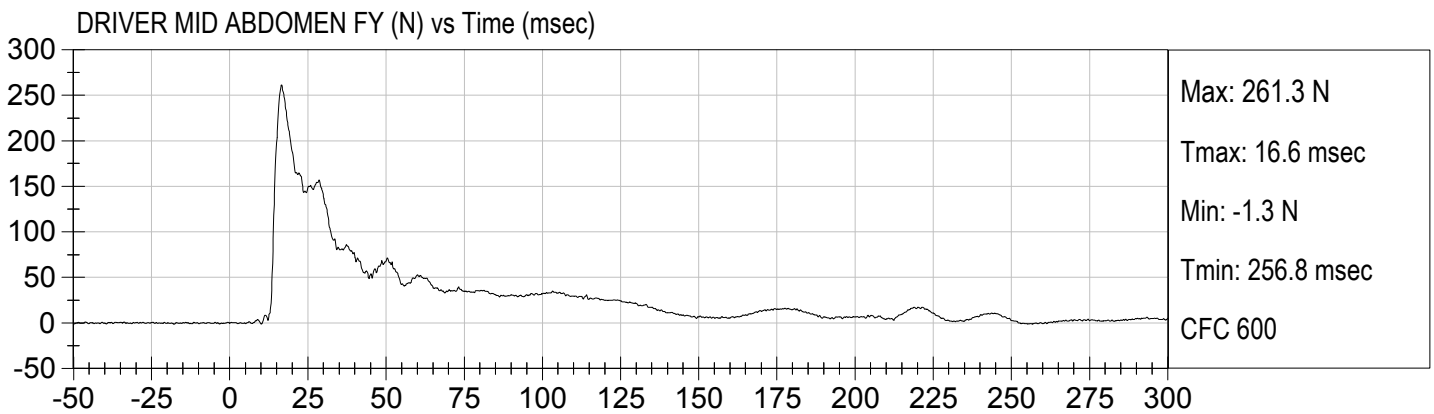
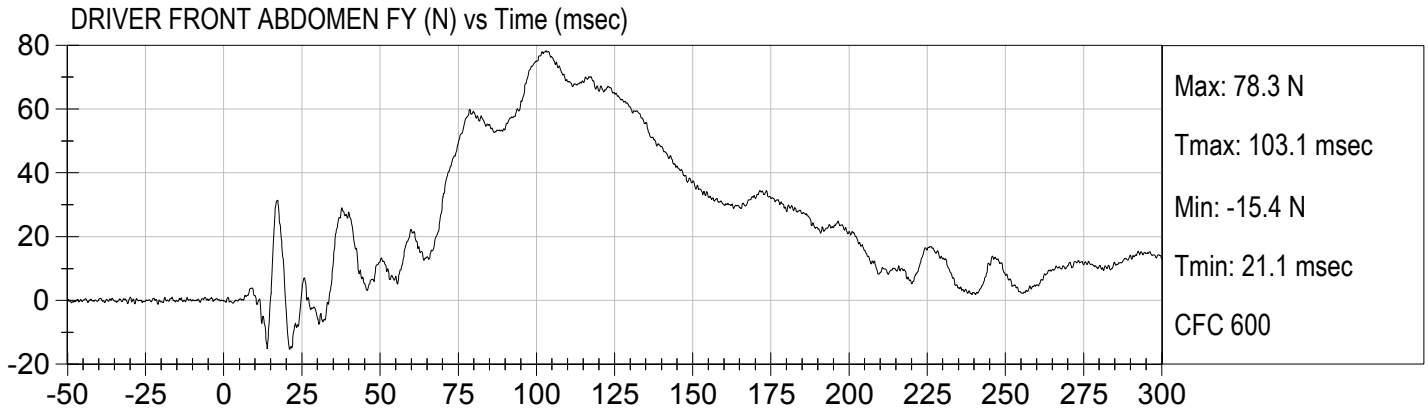
MDB Rear Acceleration (Y)

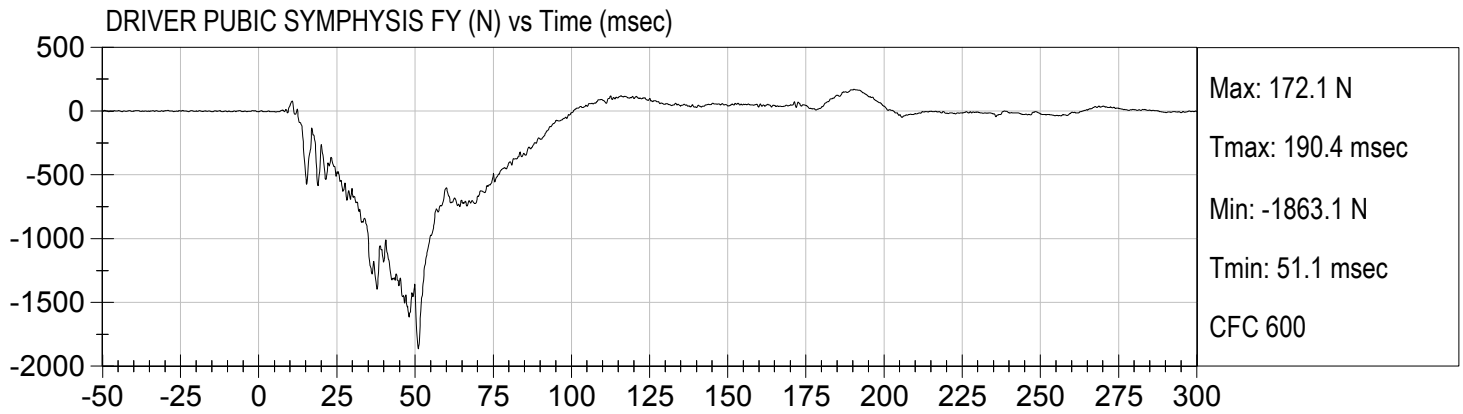
Left MDB Contact Switch

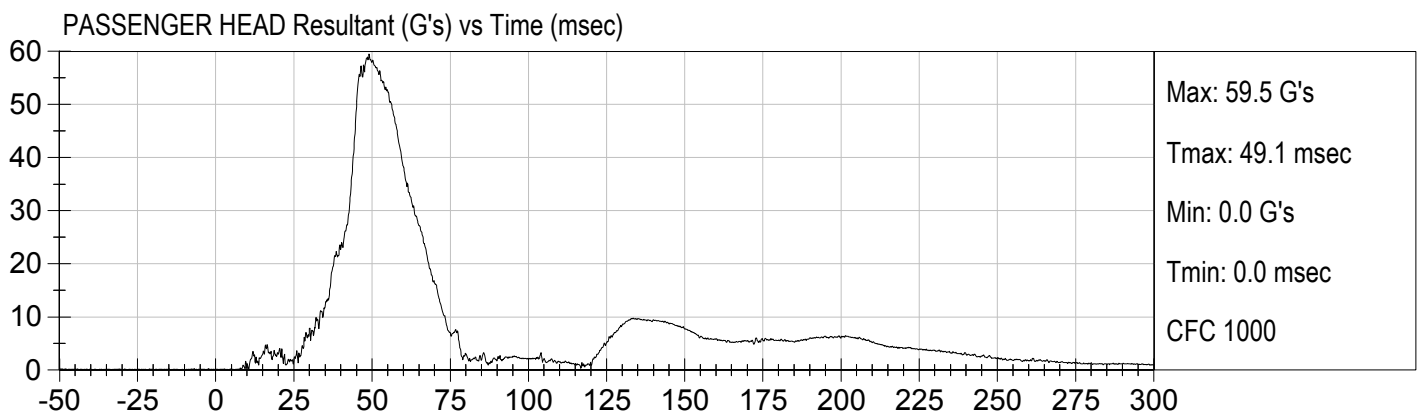
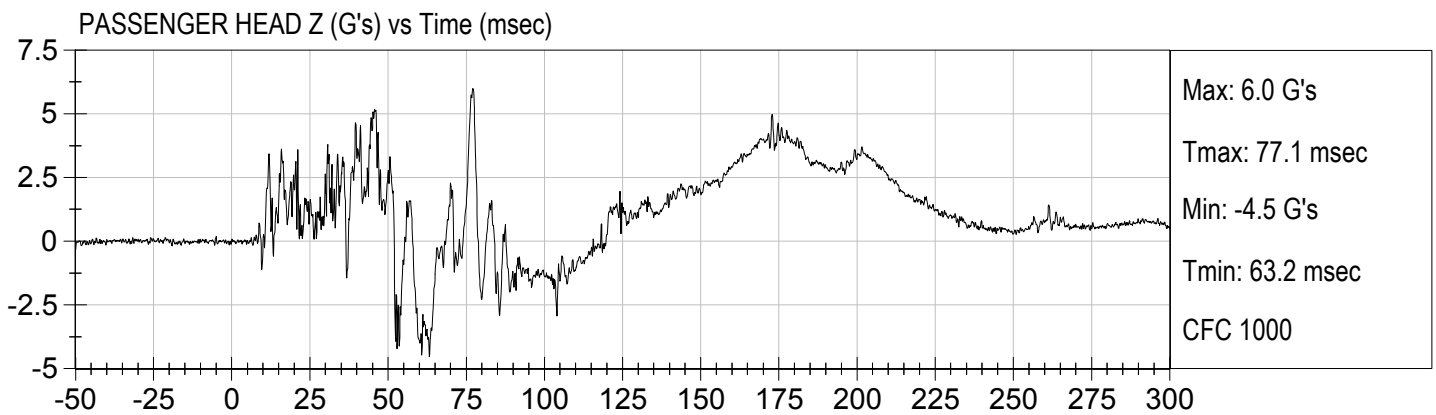
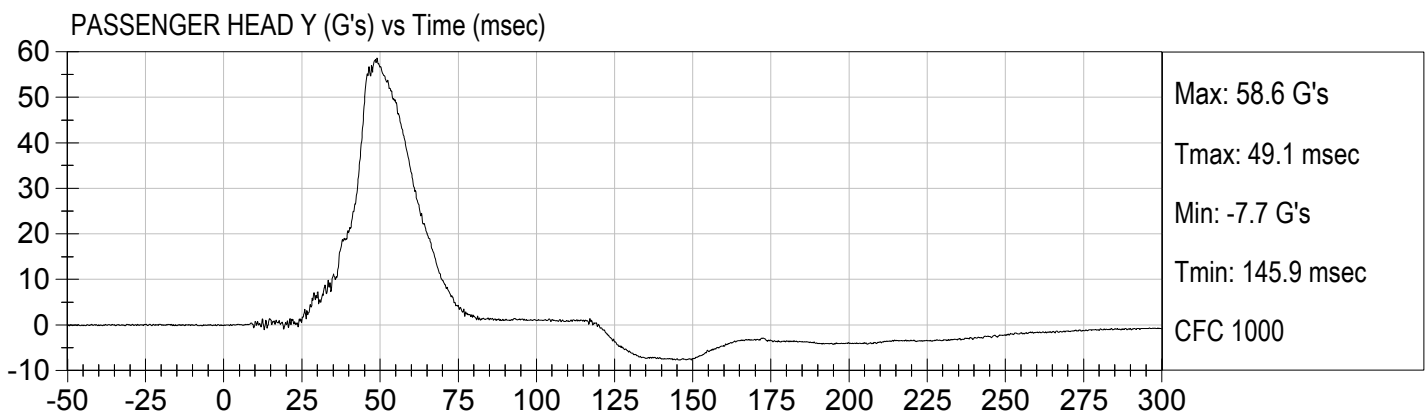
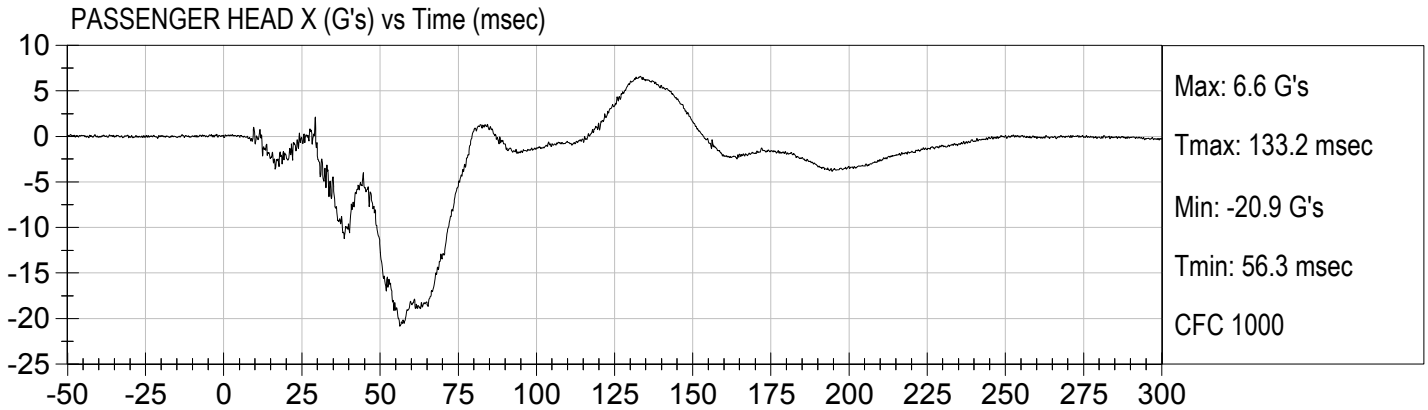
Right MDB Contact Switch

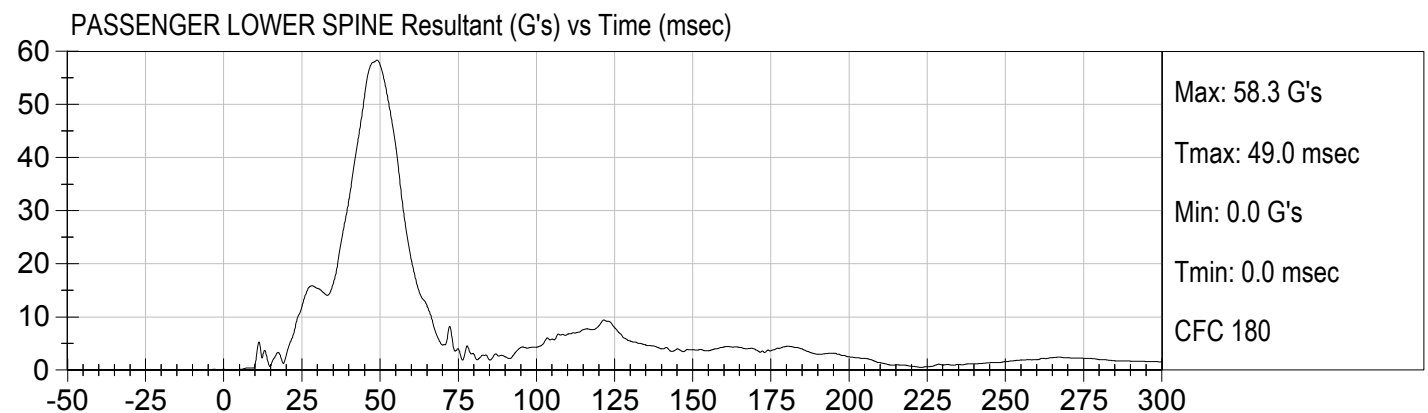
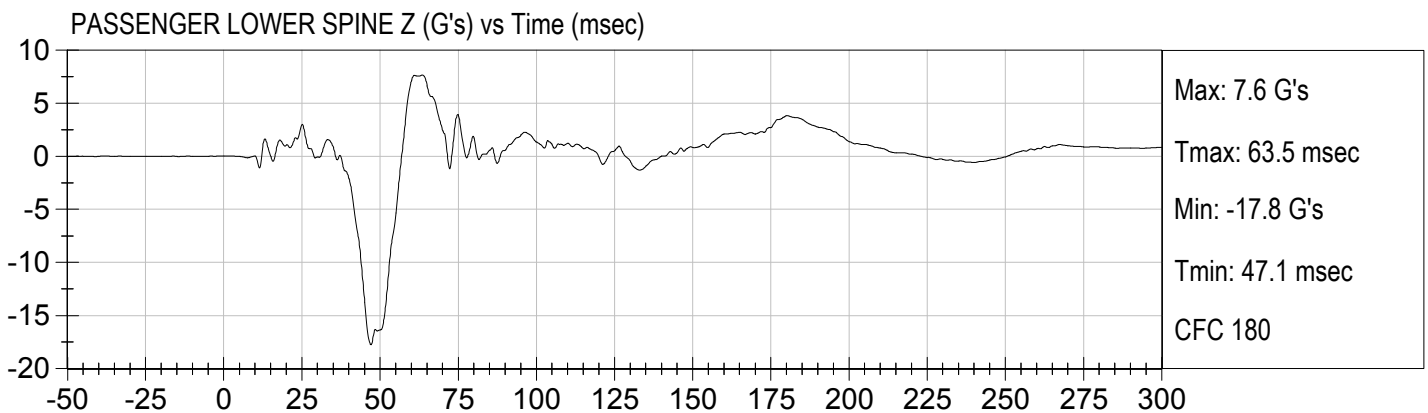
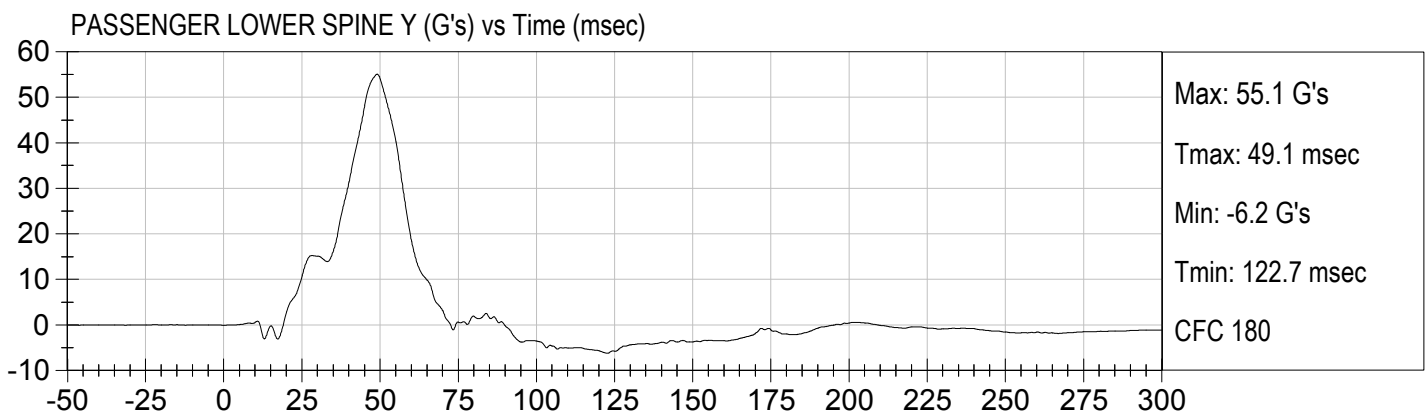
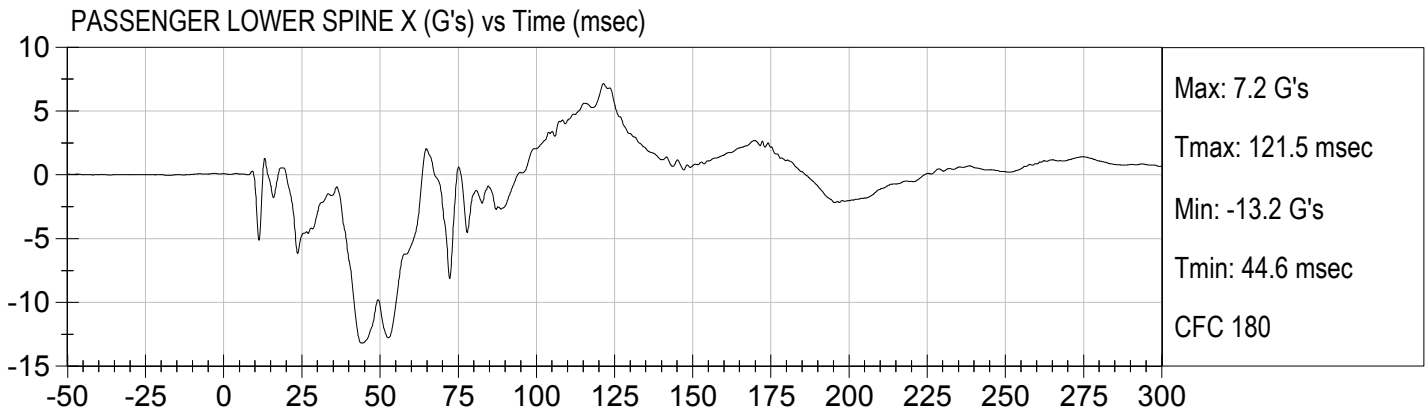


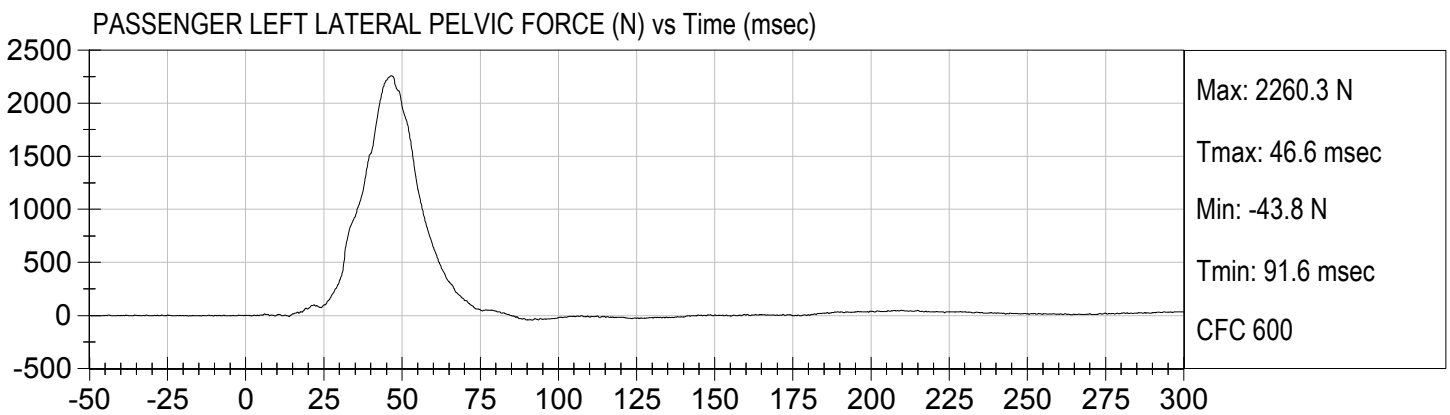
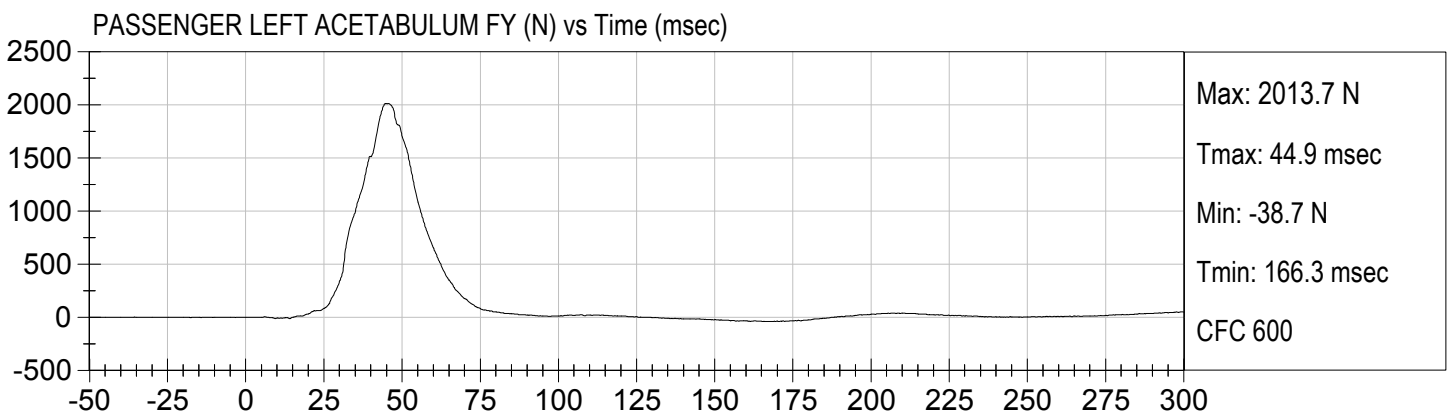
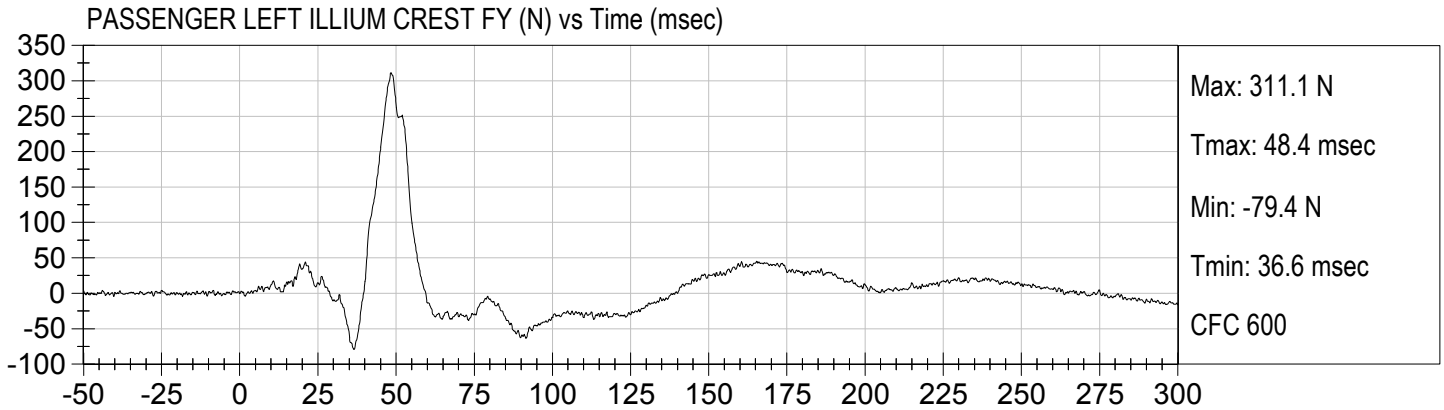












APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

ES-2re External Measurements
SN: 032

| No. | Name | Spec. (mm) | Result | Pass/Fail |
|------------|--|-------------------|---------------|------------------|
| 1 | Sitting Height | 900 - 918 | 915 | Pass |
| 2 | Seat to Shoulder Joint | 558 - 572 | 568 | Pass |
| 3 | Seat to Lower Face of Thoracic Spine Box | 346 - 356 | 355 | Pass |
| 4 | Seat to Hip Joint (center of bolt) | 97 - 103 | 98 | Pass |
| 5 | Sole to Seat, Sitting | 333 - 451 | 440 | Pass |
| 6 | Head Width | 152 - 158 | 157 | Pass |
| 7 | Shoulder/Arm Width | 461 - 479 | 464 | Pass |
| 8 | Thorax Width | 322 - 332 | 323 | Pass |
| 9 | Abdomen Width | 273 - 287 | 281 | Pass |
| 10 | Pelvis Lap Width | 359 - 373 | 370 | Pass |
| 11 | Head Depth | 196 - 206 | 203 | Pass |
| 12 | Thorax Depth | 262 - 272 | 264 | Pass |
| 13 | Abdomen Depth | 194 - 204 | 196 | Pass |
| 14 | Pelvis Depth | 235 - 245 | 236 | Pass |
| 15 | Back of Buttocks to Hip Joint (center of bolt) | 150 - 160 | 151 | Pass |
| 16 | Back of Buttocks to Front Knee | 597 - 615 | 607 | Pass |

MGA RESEARCH CORPORATION
HEAD DROP TEST
ES-2re DUMMY

ATD Serial No: 032

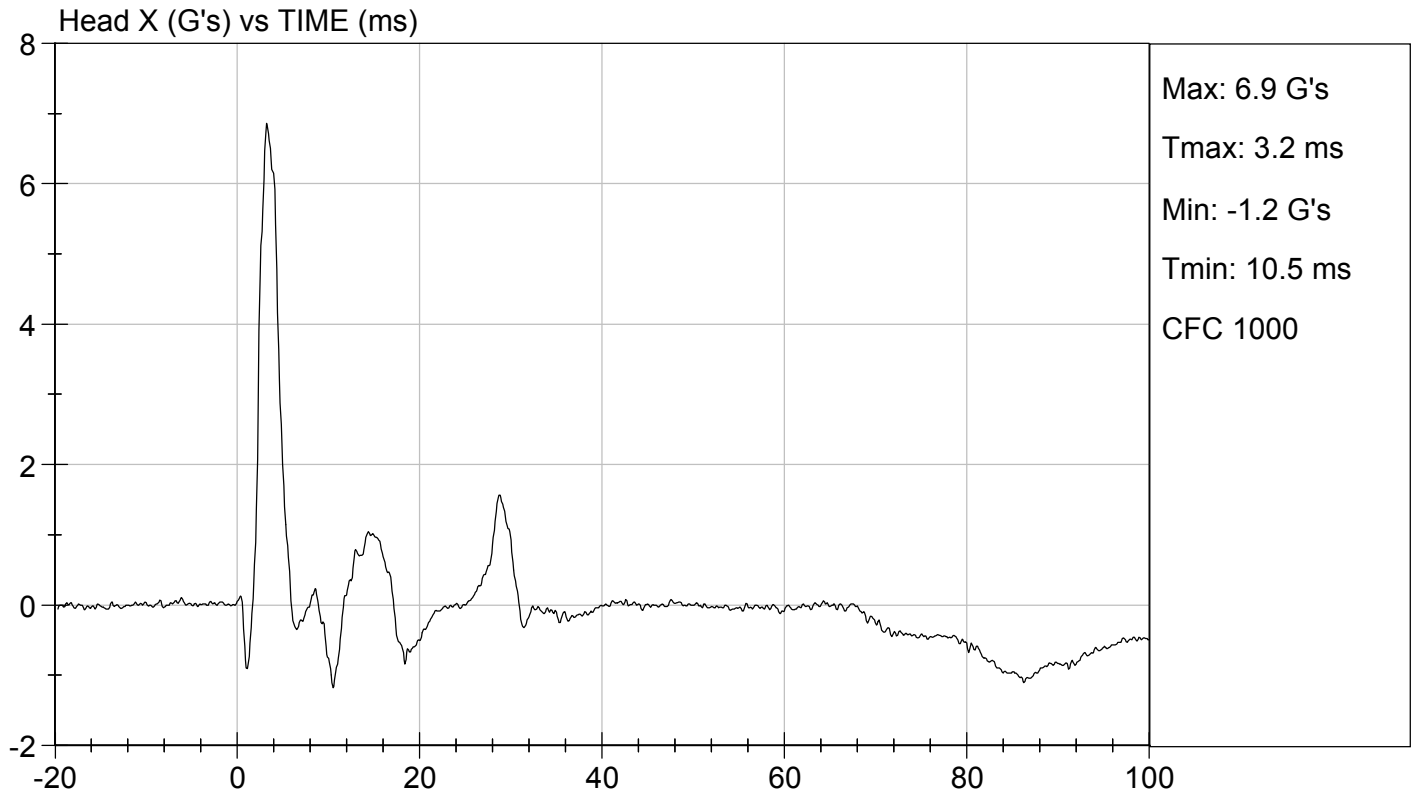
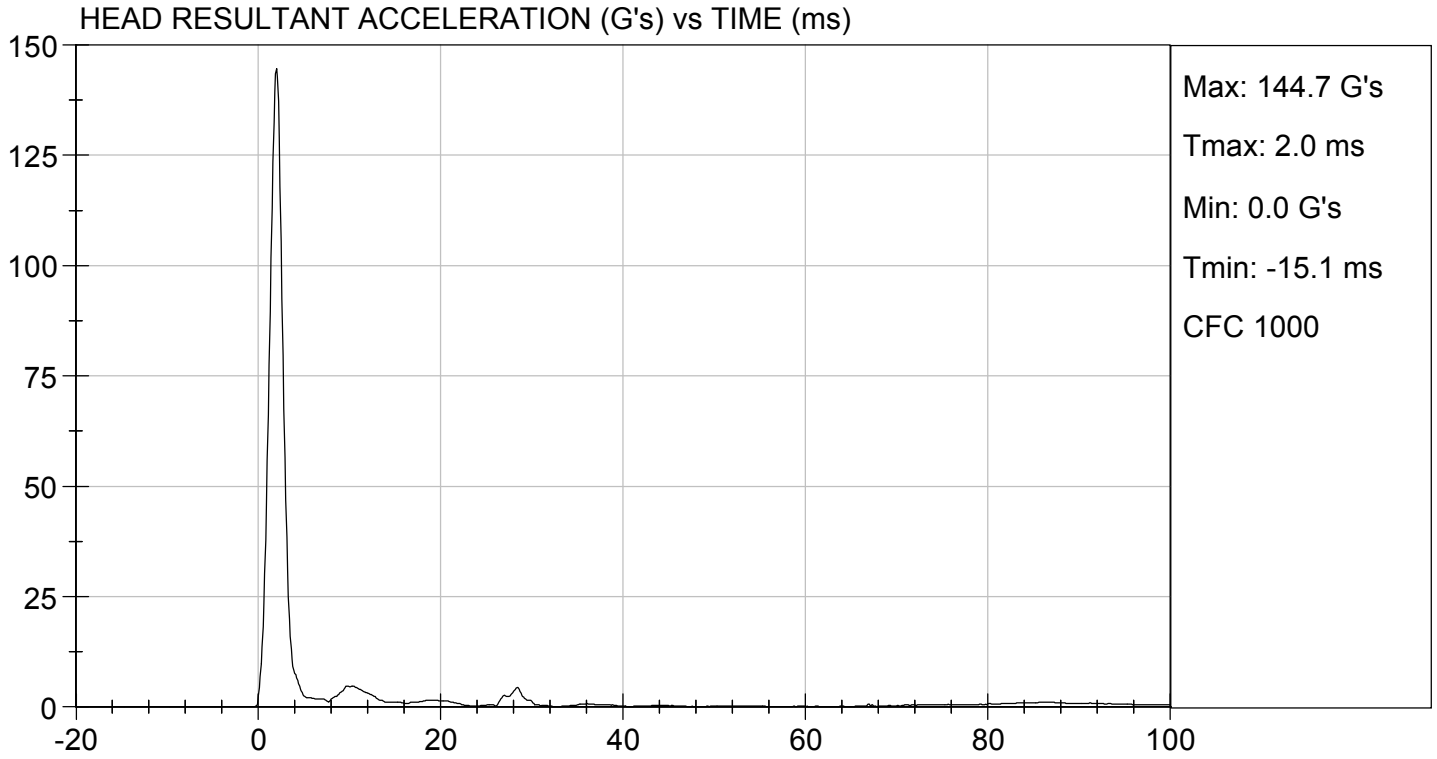
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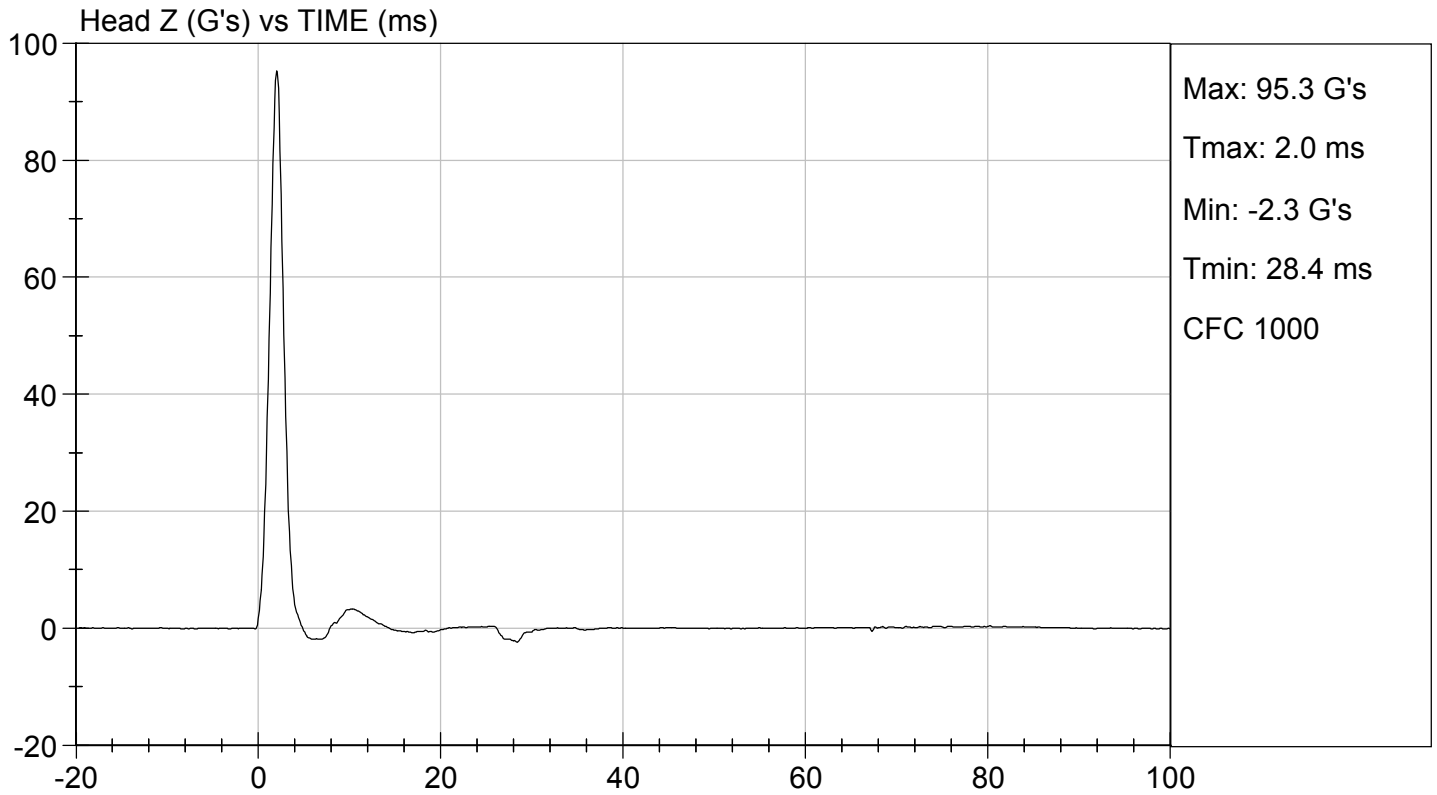
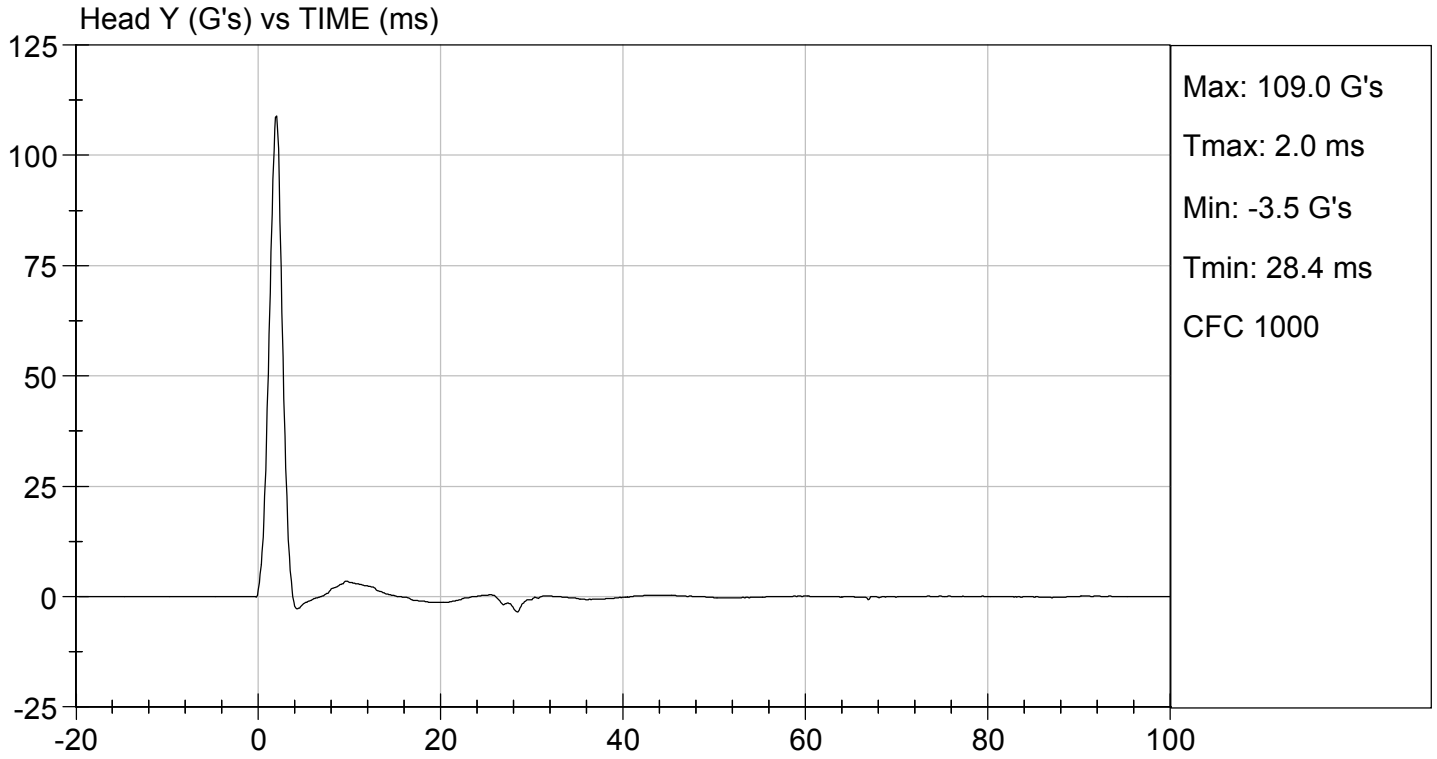
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|--------------------|--------|-----------|
| Laboratory Temperature | deg C | 18.9 to 25.6 | 21.3 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 44 | Pass |
| Peak Resultant Acceleration | G's | 125 to 155 | 145 | Pass |
| Peak Longitudinal Acceleration | G's | <= +/- 15.0 | 6.9 | Pass |
| Unimodal | N/A | Yes | Yes | Pass |
| Oscillations | N/A | within 15% of peak | Yes | Pass |
| Overall Test Results | | | | Pass |

Danielle Redinlaugh
 Laboratory Technician

10/02/2017
 Test Date

B. F. K.
 Approved By





**MGA RESEARCH CORPORATION
NECK PENDULUM TEST
ES-2re DUMMY**

ATD Serial No: 032

Test I.D.: D172802

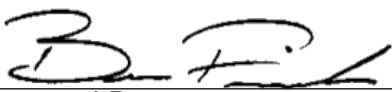
| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|--------------------------------------|-------|---------------|-----------------|-----------|------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 20.7 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 52 | Pass | |
| Pendulum Speed | m/s | 3.30 to 3.50 | 3.48 | Pass | |
| Pendulum Velocity | 1 ms | m/s | -0.05 to 0.00 | -0.01 | Pass |
| | 3 ms | m/s | -0.25 to -0.375 | -0.32 | Pass |
| | 14 ms | m/s | -3.20 to -3.70 | -3.51 | Pass |
| | 17 ms | m/s | >= -3.70 | -3.44 | Pass |
| Maximum Flexion Angle | deg | 49.0 to 59.0 | 49.2 | Pass | |
| Time of Maximum Flexion Angle | ms | 54.0 to 66.0 | 56.7 | Pass | |
| Head Rotation Decay Time to 0 Degree | ms | 53.0 to 88.0 | 53.4 | Pass | |
| Overall Results | | | | Pass | |



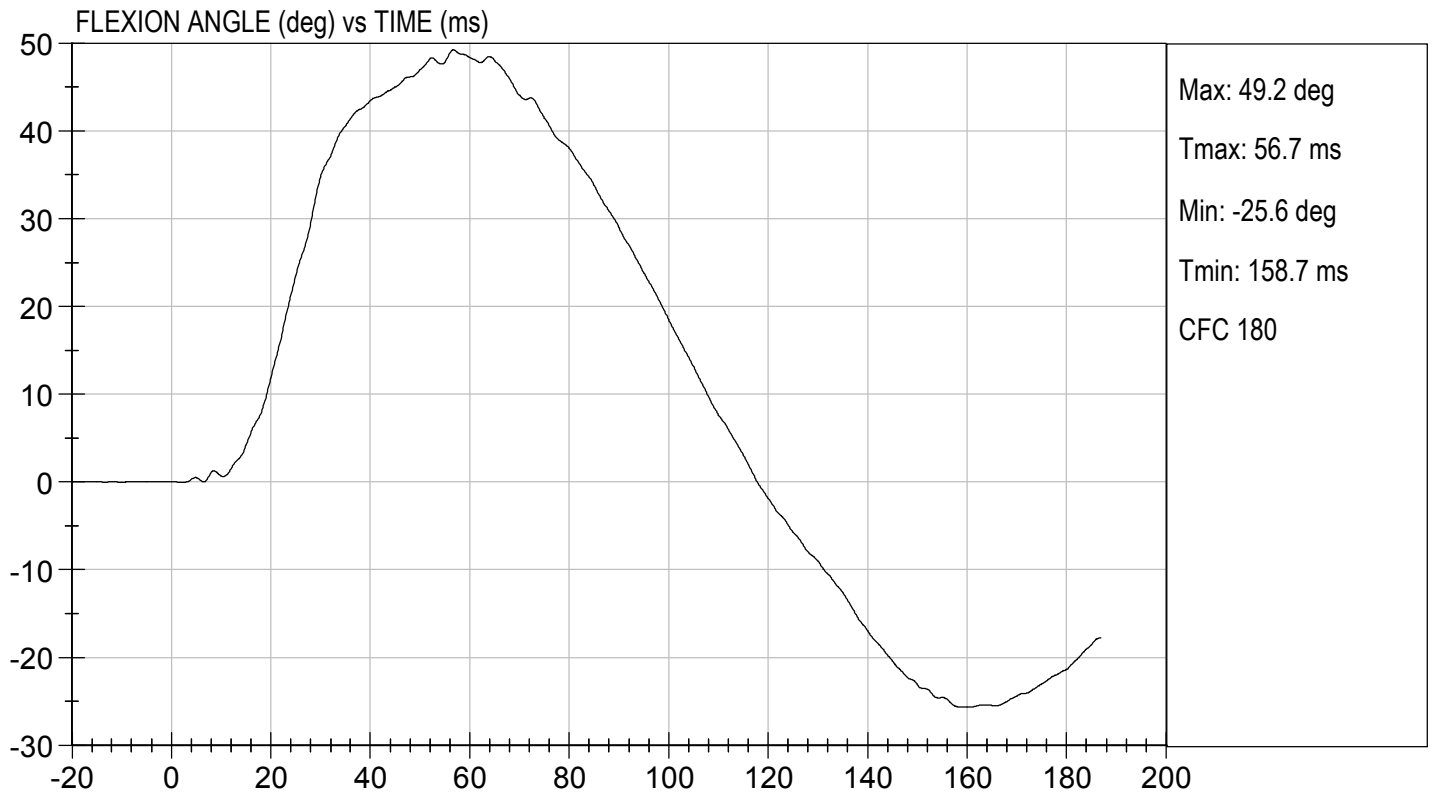
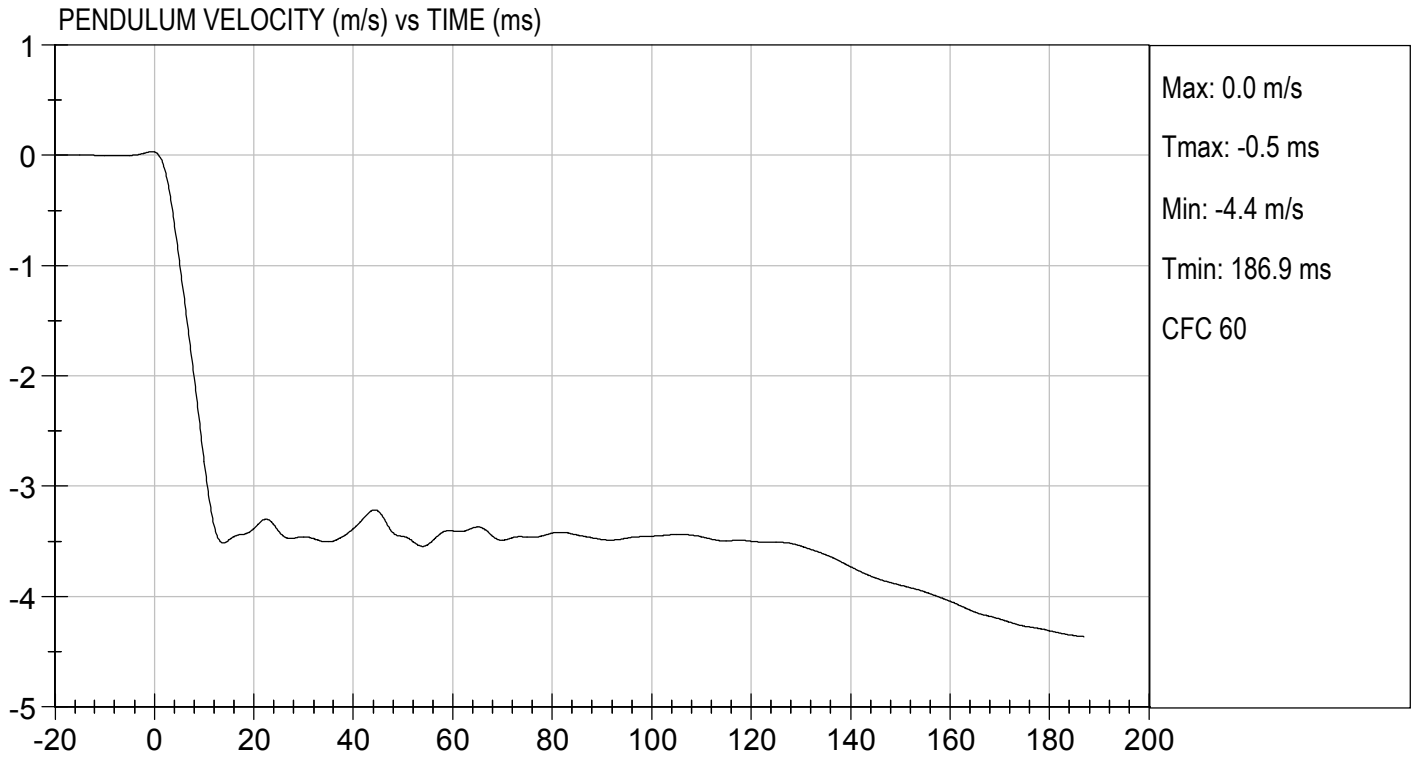
Laboratory Technician

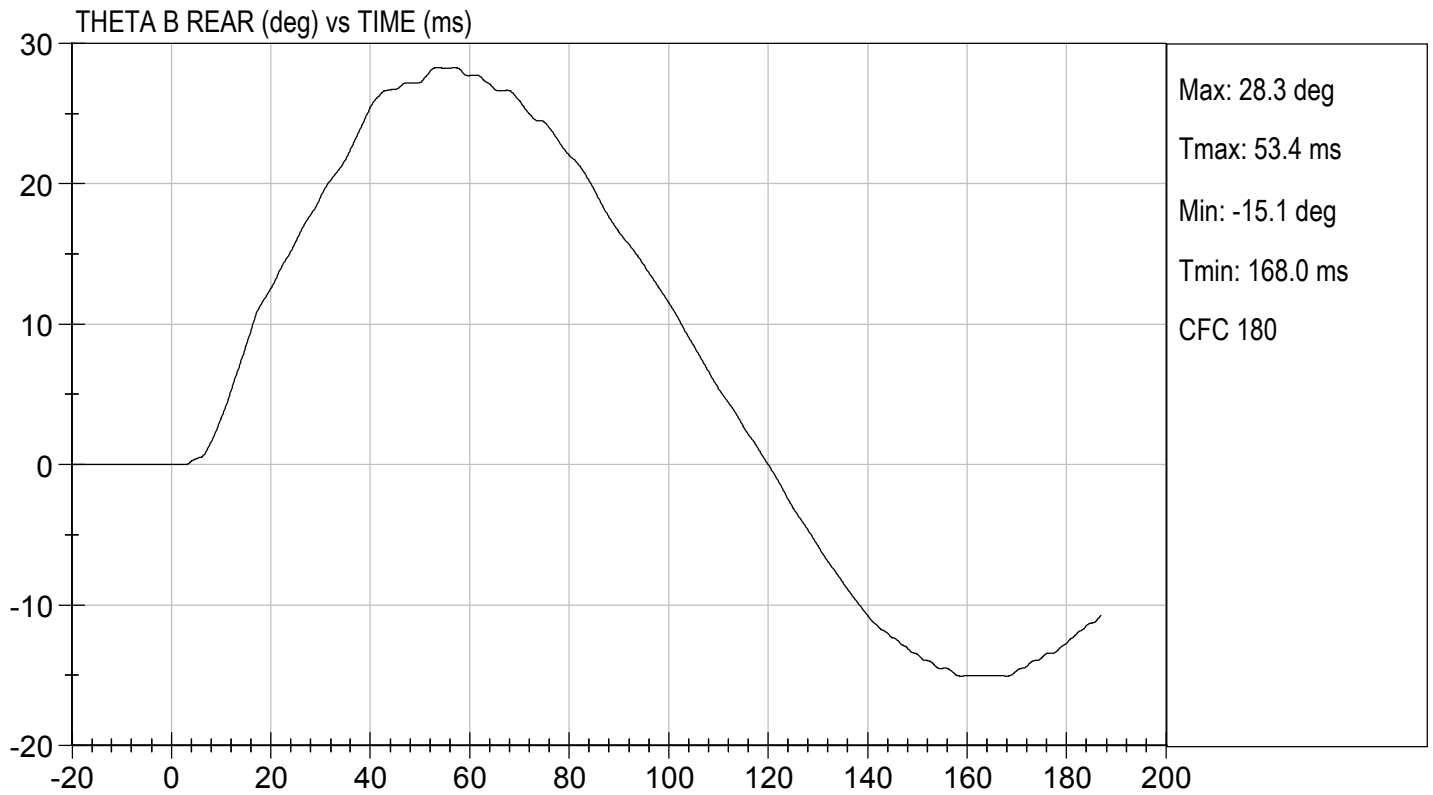
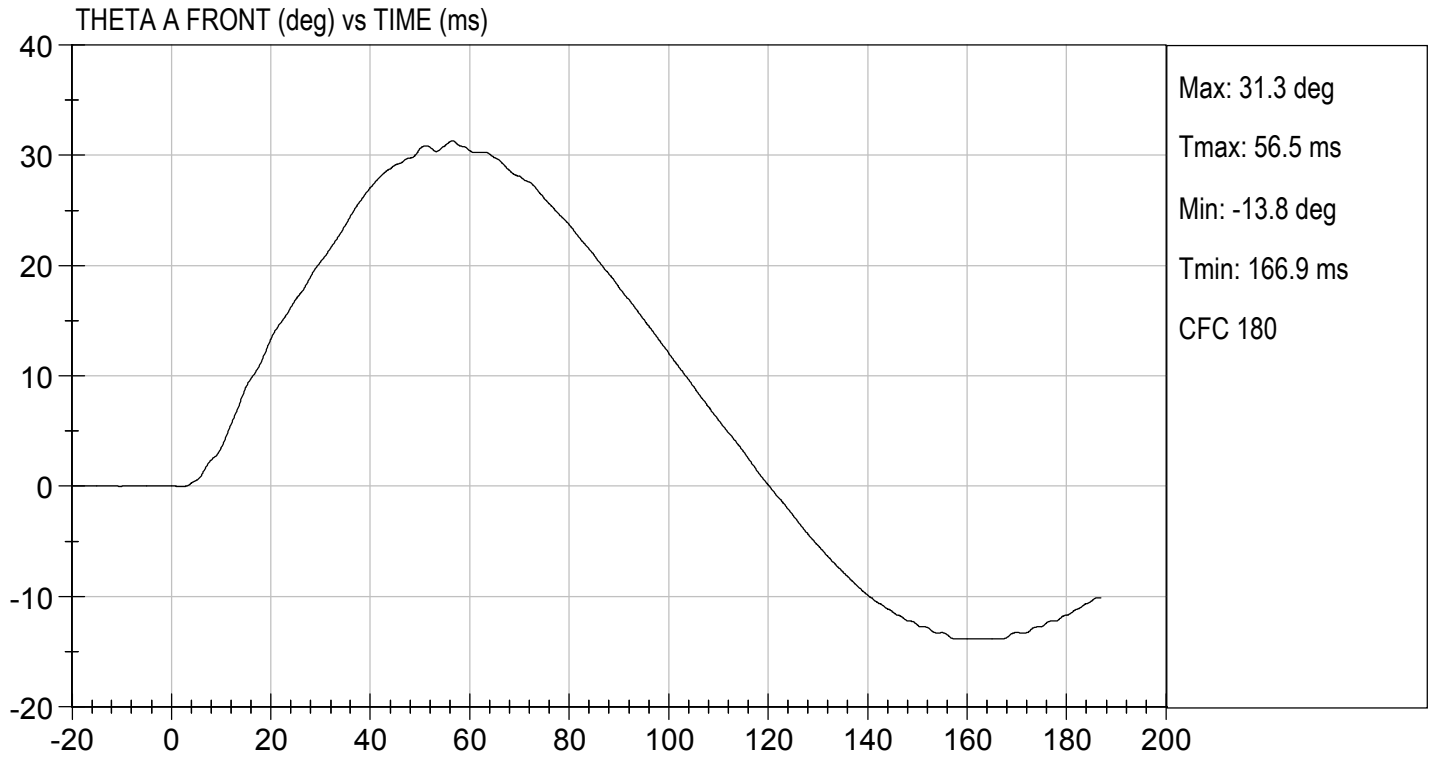
10/02/2017

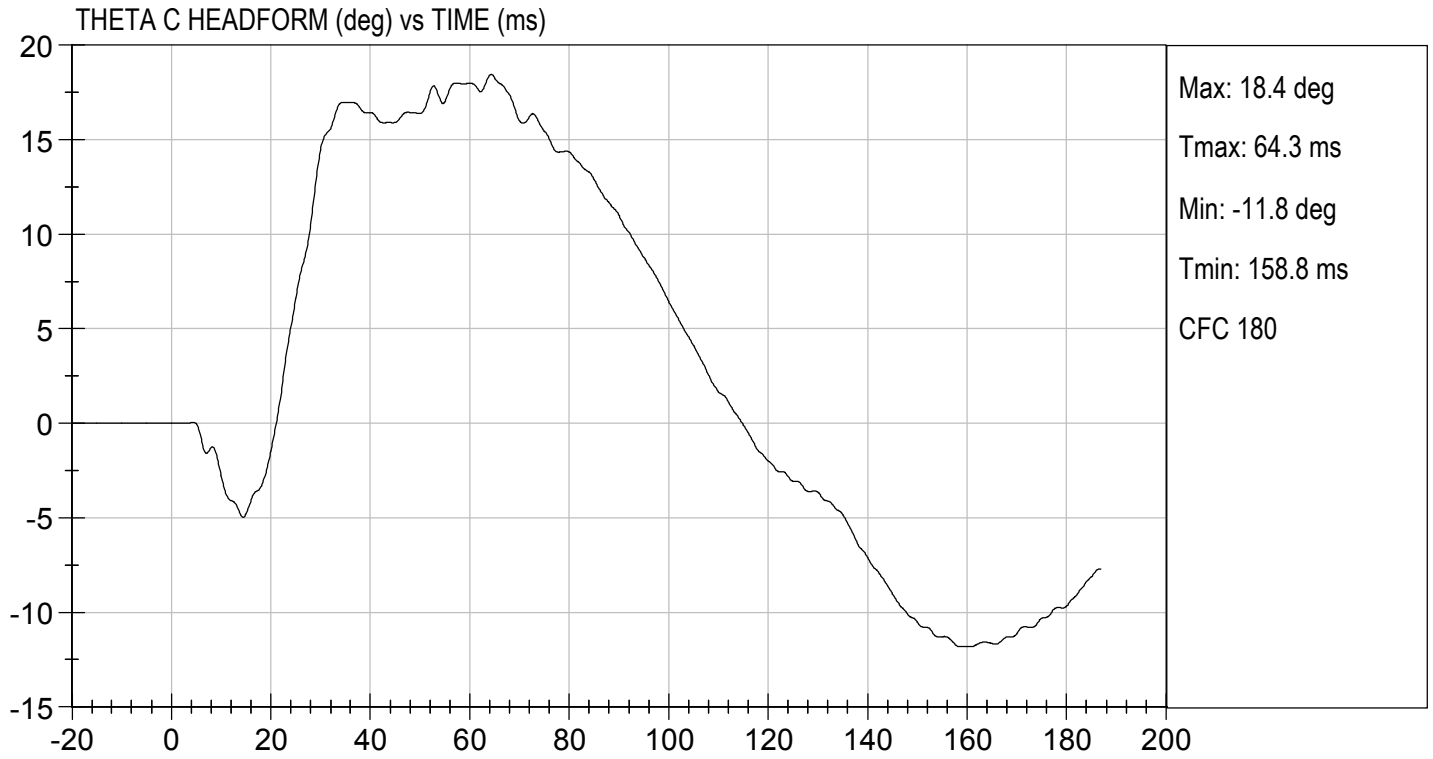
Test Date



Approved By







MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
ES-2re DUMMY

ATD Serial No: 032

Test I.D: D172803

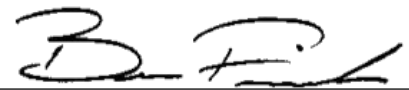
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 57 | Pass |
| Pendulum Speed | m/s | 4.20 to 4.40 | 4.2 | Pass |
| Peak Impactor Acceleration | G's | 7.5 to 10.5 | 9.6 | Pass |
| Overall Test Results | | | | Pass |



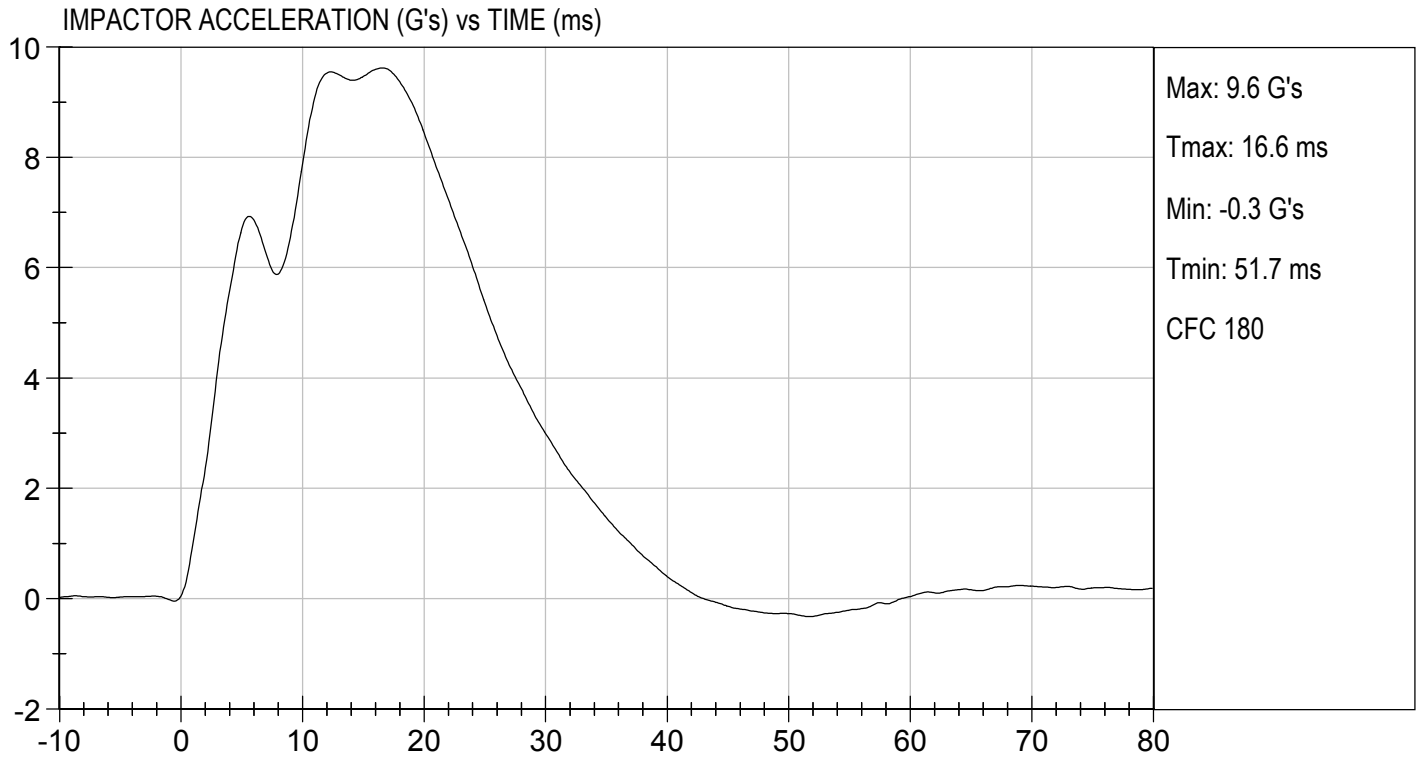
 Laboratory Technician

10/03/2017

 Test Date



 Approved By



MGA RESEARCH CORPORATION

UPPER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D172804

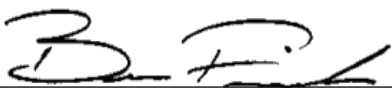
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 20.7 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 52 | Pass |
| Displacement at 459 mm | mm | 36.0 to 40.0 | 39.1 | Pass |
| Displacement at 815 mm | mm | 46.0 to 51.0 | 49.6 | Pass |
| Overall Test Results | | | | Pass |



Laboratory Technician

10/02/2017

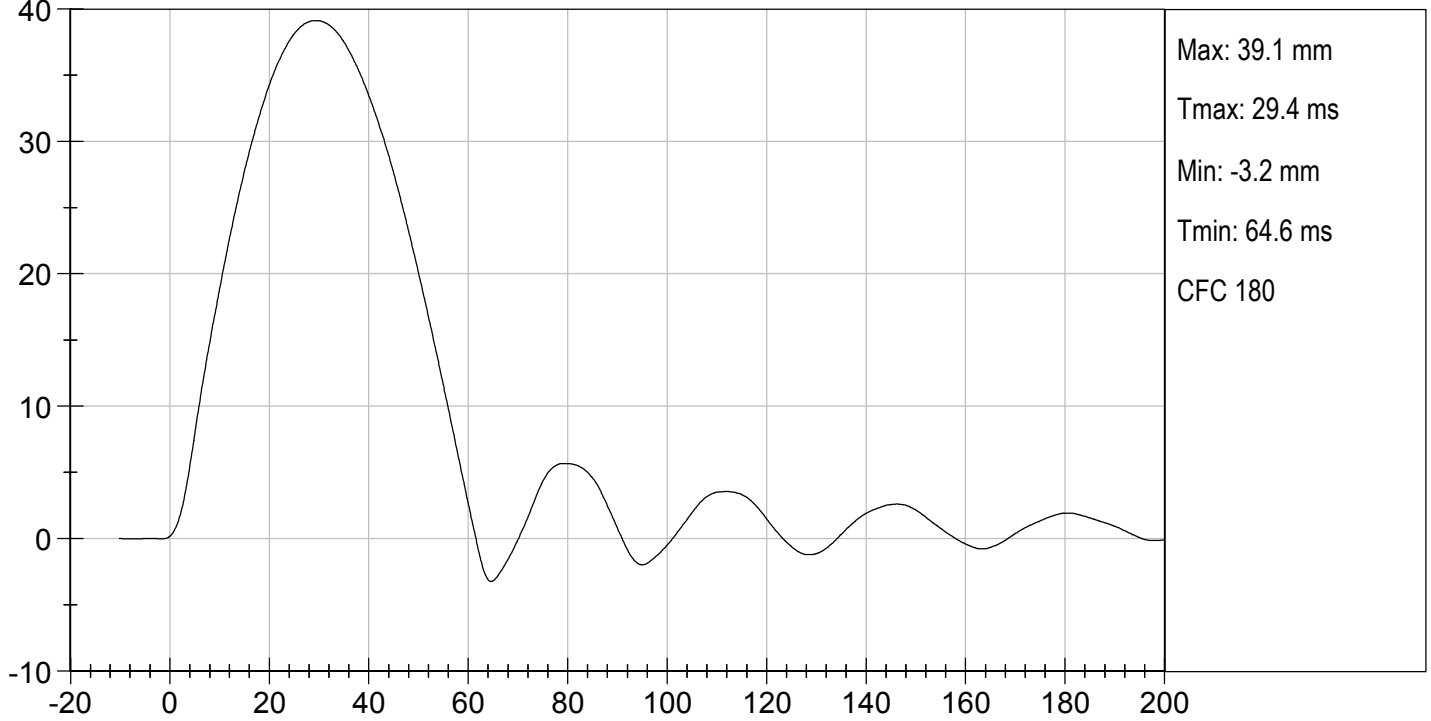
Test Date



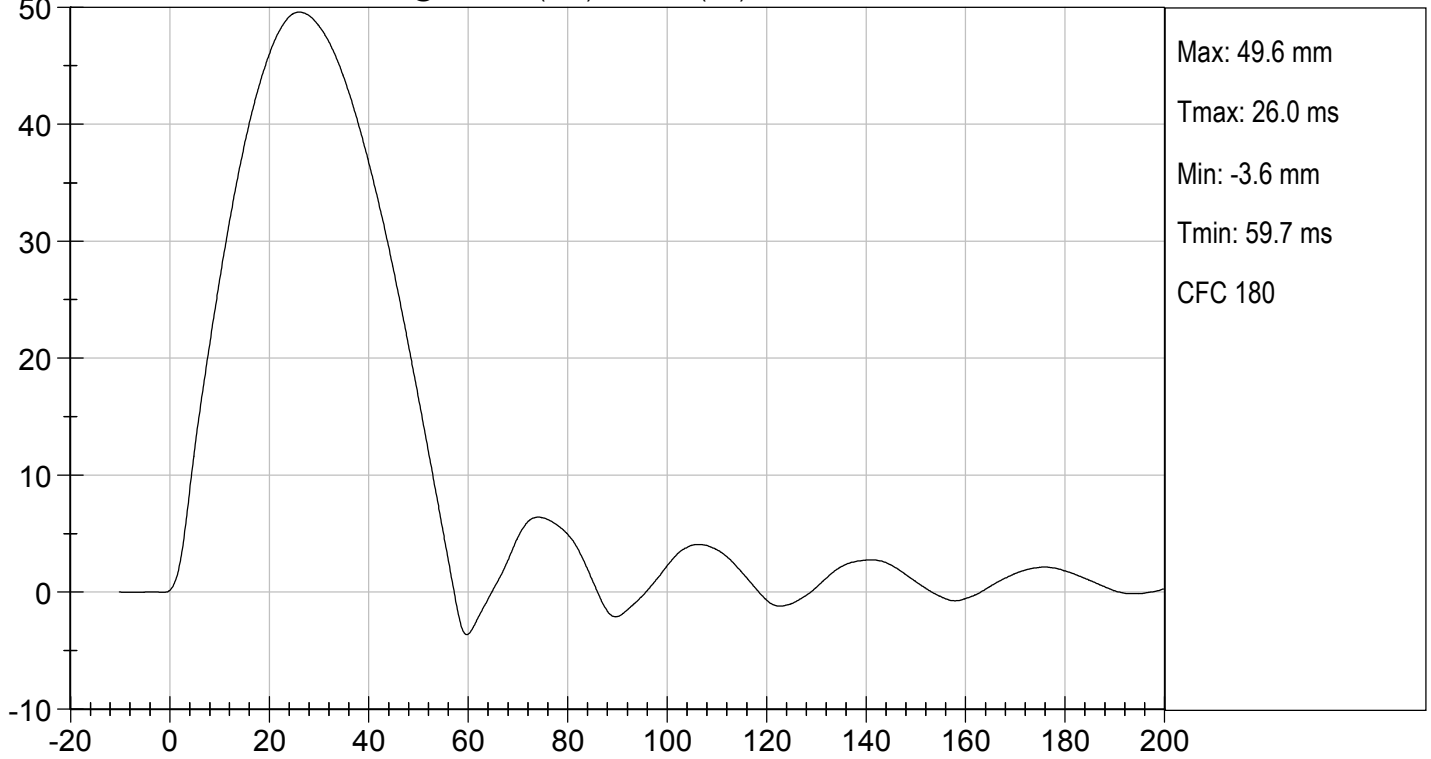
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UPPER RIB DISPLACEMENT @ 459 mm (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT @ 815 mm (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D172805

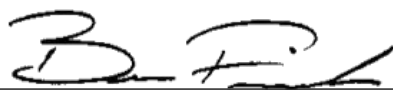
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 20.7 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 52 | Pass |
| Displacement at 459 mm | mm | 36.0 to 40.0 | 38.2 | Pass |
| Displacement at 815 mm | mm | 46.0 to 51.0 | 48.4 | Pass |
| Overall Test Results | | | | Pass |



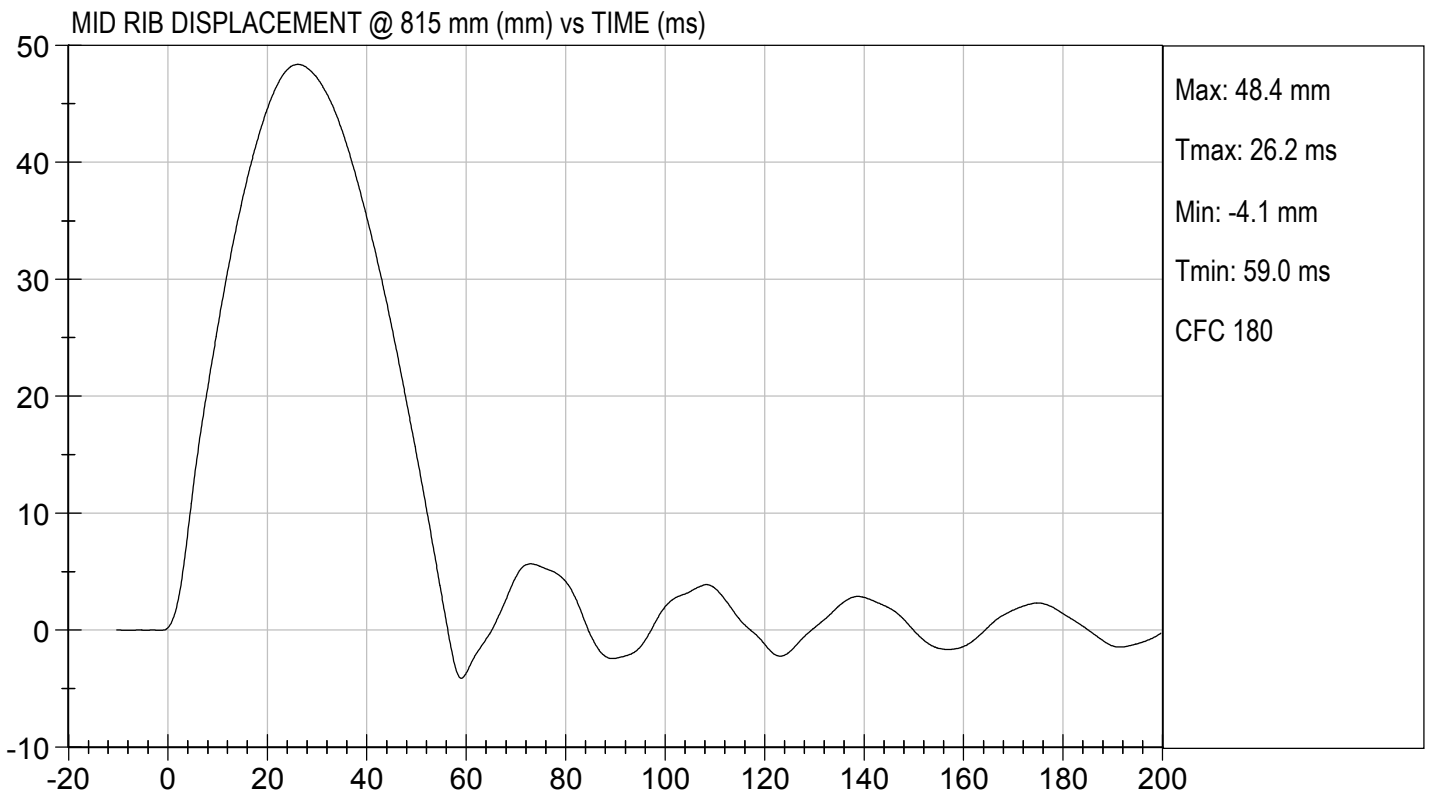
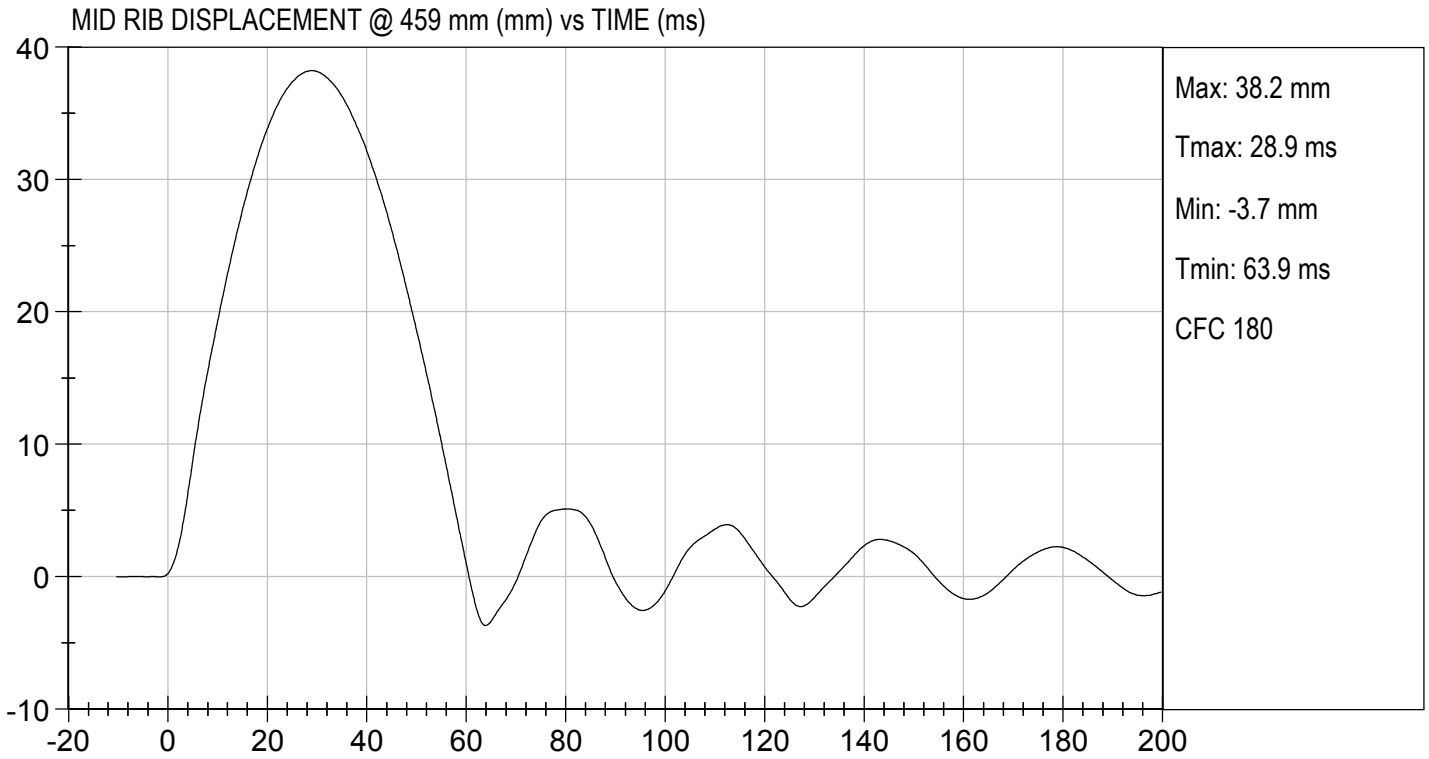
Laboratory Technician

10/02/2017

Test Date



Approved By



MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D172806

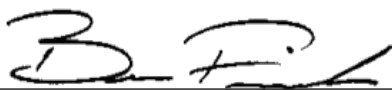
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 20.7 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 52 | Pass |
| Displacement at 459 mm | mm | 36.0 to 40.0 | 39.0 | Pass |
| Displacement at 815 mm | mm | 46.0 to 51.0 | 50.7 | Pass |
| Overall Test Results | | | | Pass |



Laboratory Technician

10/02/2017

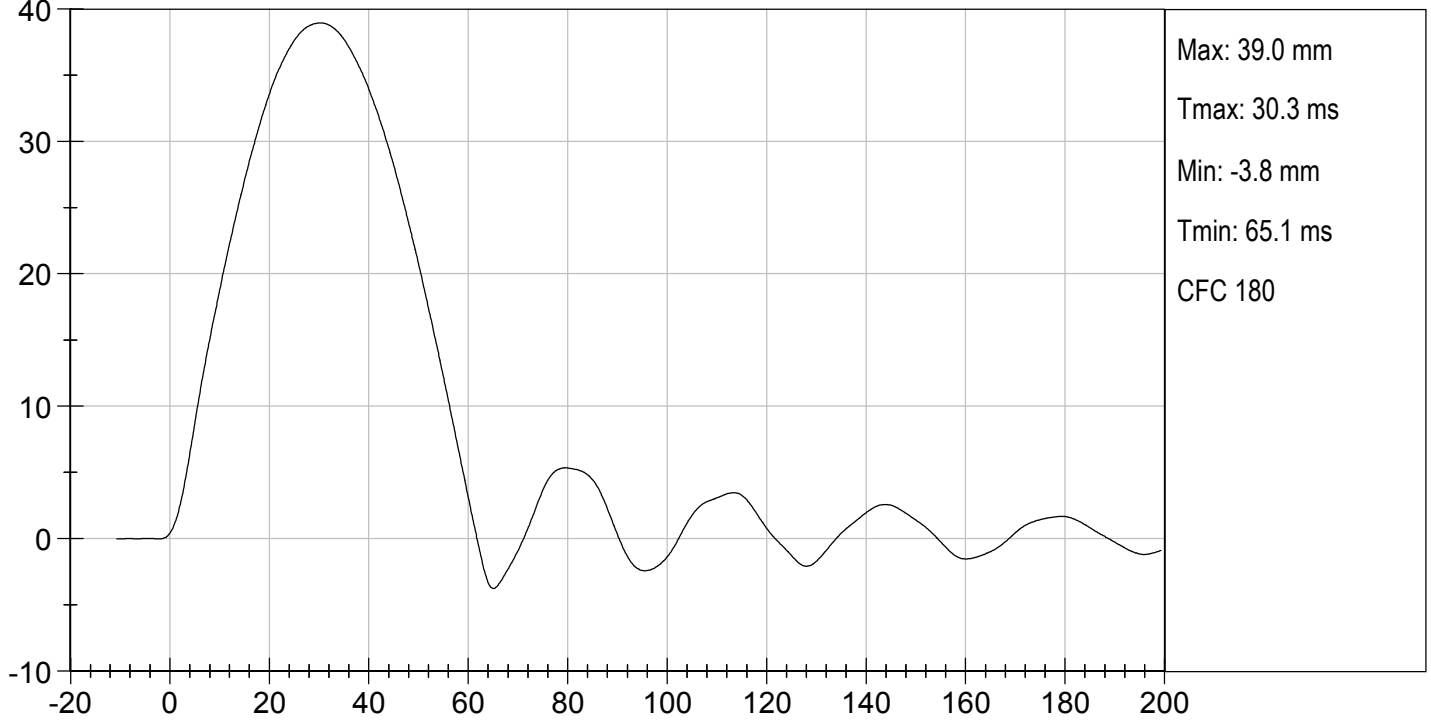
Test Date



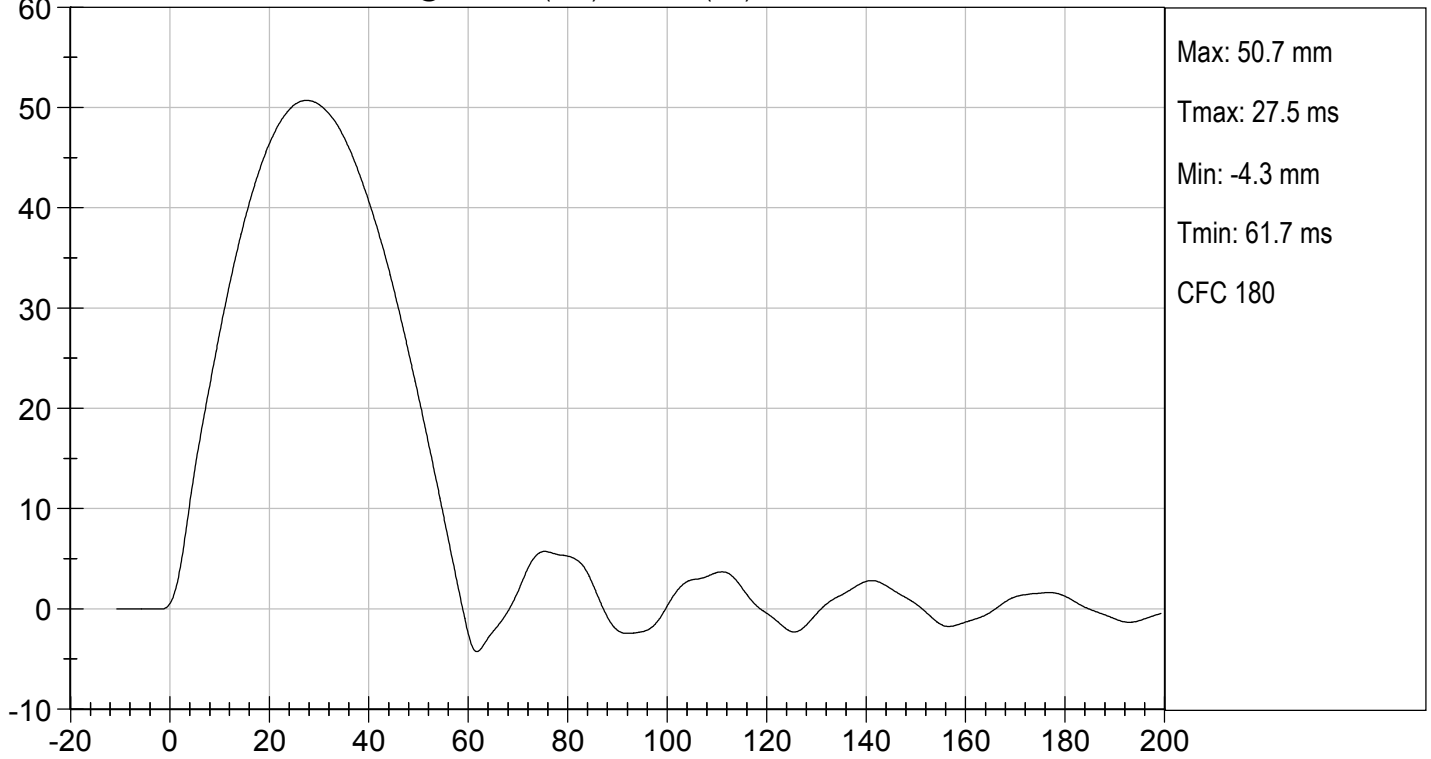
Approved By



LOWER RIB DISPLACEMENT @ 459 mm (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT @ 815 mm (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

ABDOMEN TEST

ES-2re DUMMY

ATD Serial No: 032

Test I.D: D172807

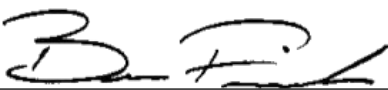
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 57 | Pass |
| Probe Speed | m/s | 3.90 to 4.10 | 4.10 | Pass |
| Maximum Impactor Force | N | 4000 to 4800 | 4474 | Pass |
| Time of Maximum Impactor Force | ms | 10.6 to 13.0 | 12.1 | Pass |
| Maximum Total Abdomen Force | N | 2200 to 2700 | 2365 | Pass |
| Time of Maximum Abdomen Force | ms | 10.0 to 12.3 | 12.0 | Pass |
| Overall Test Results | | | | Pass |



Laboratory Technician

10/03/2017

Test Date

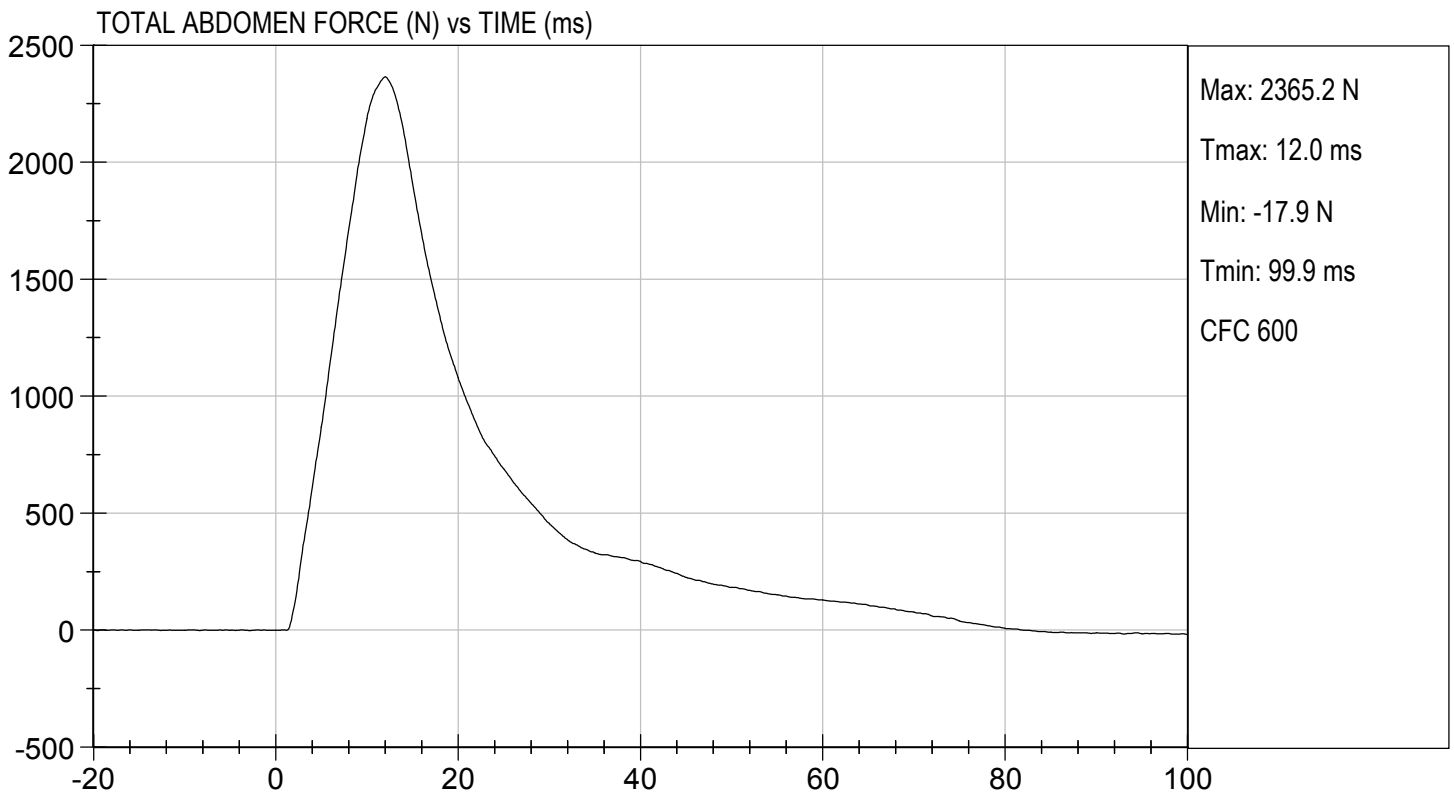
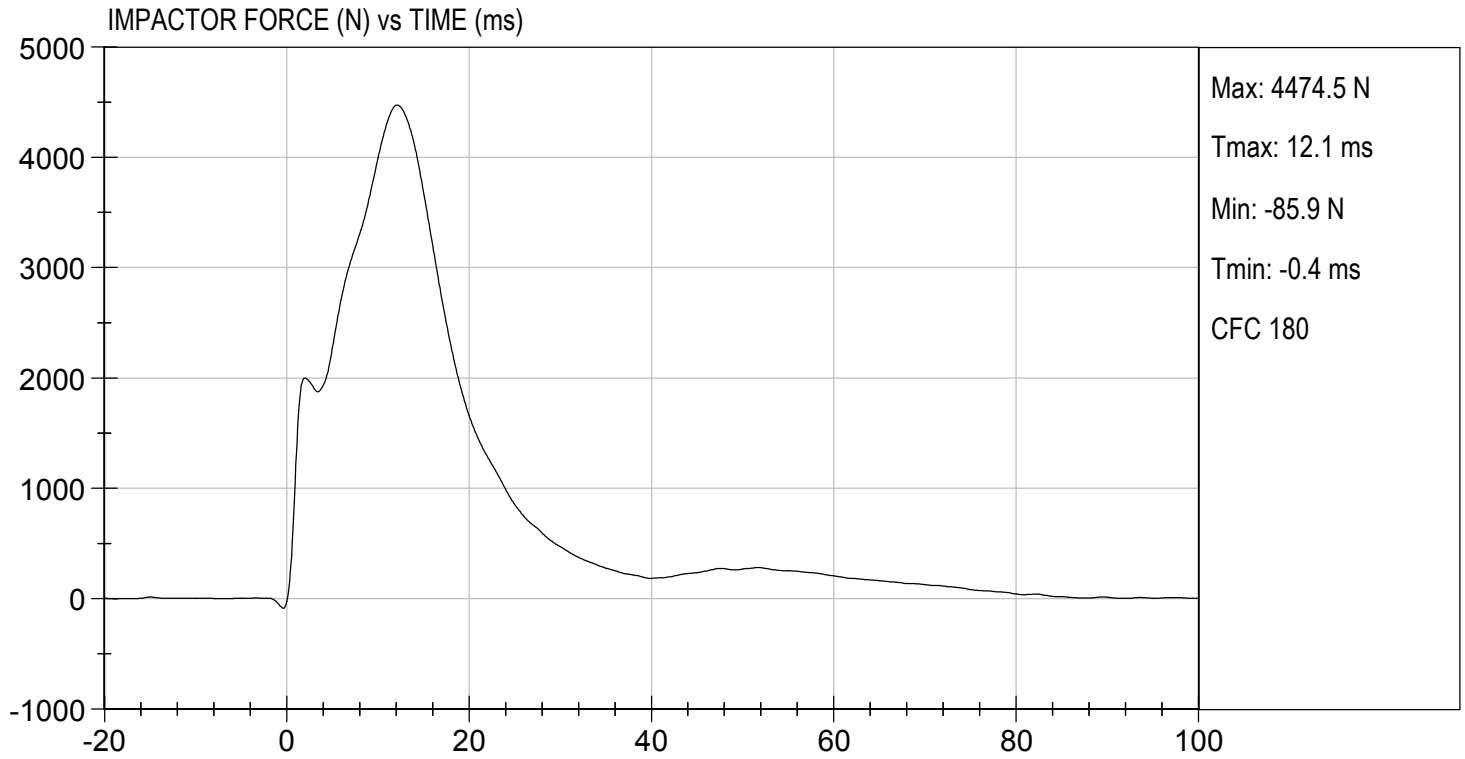


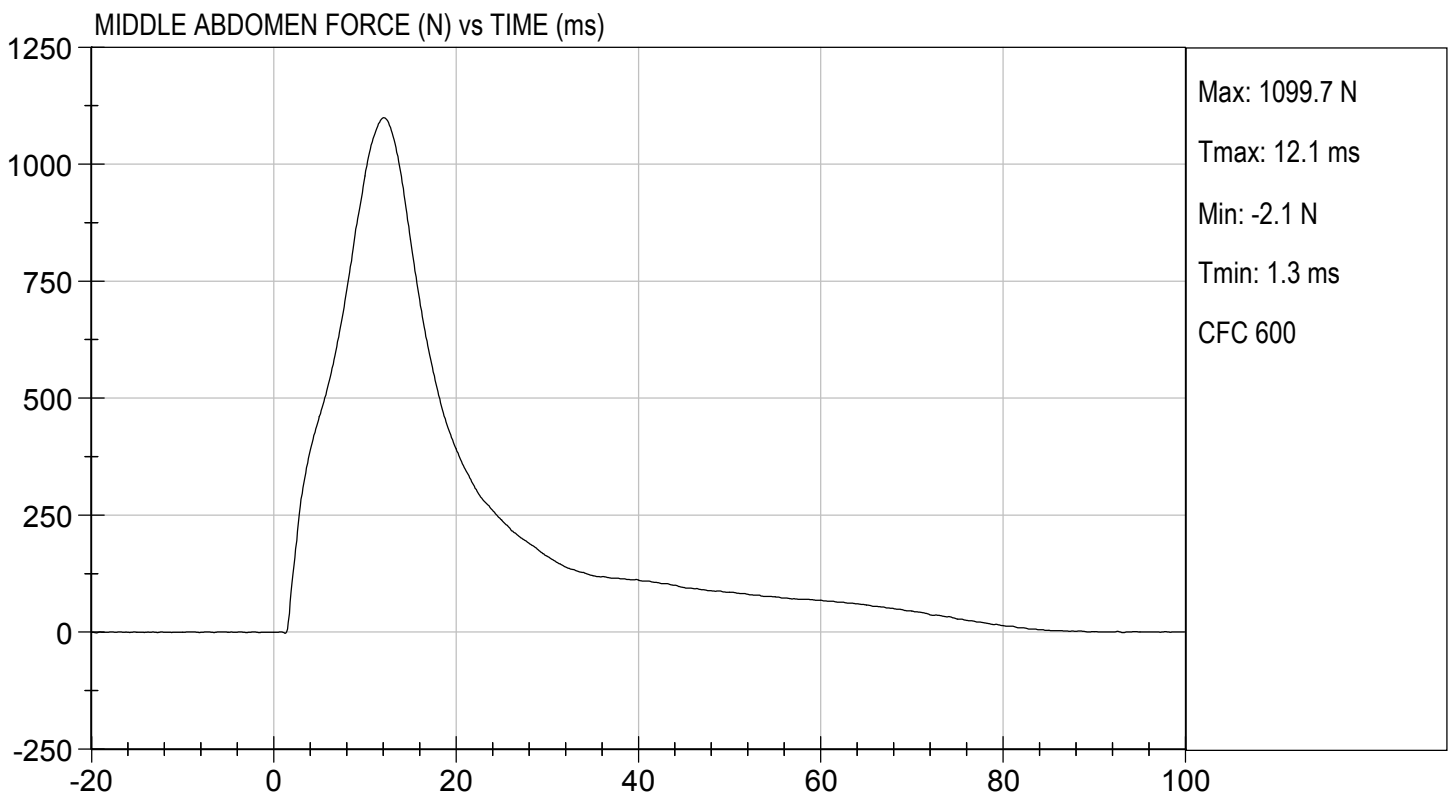
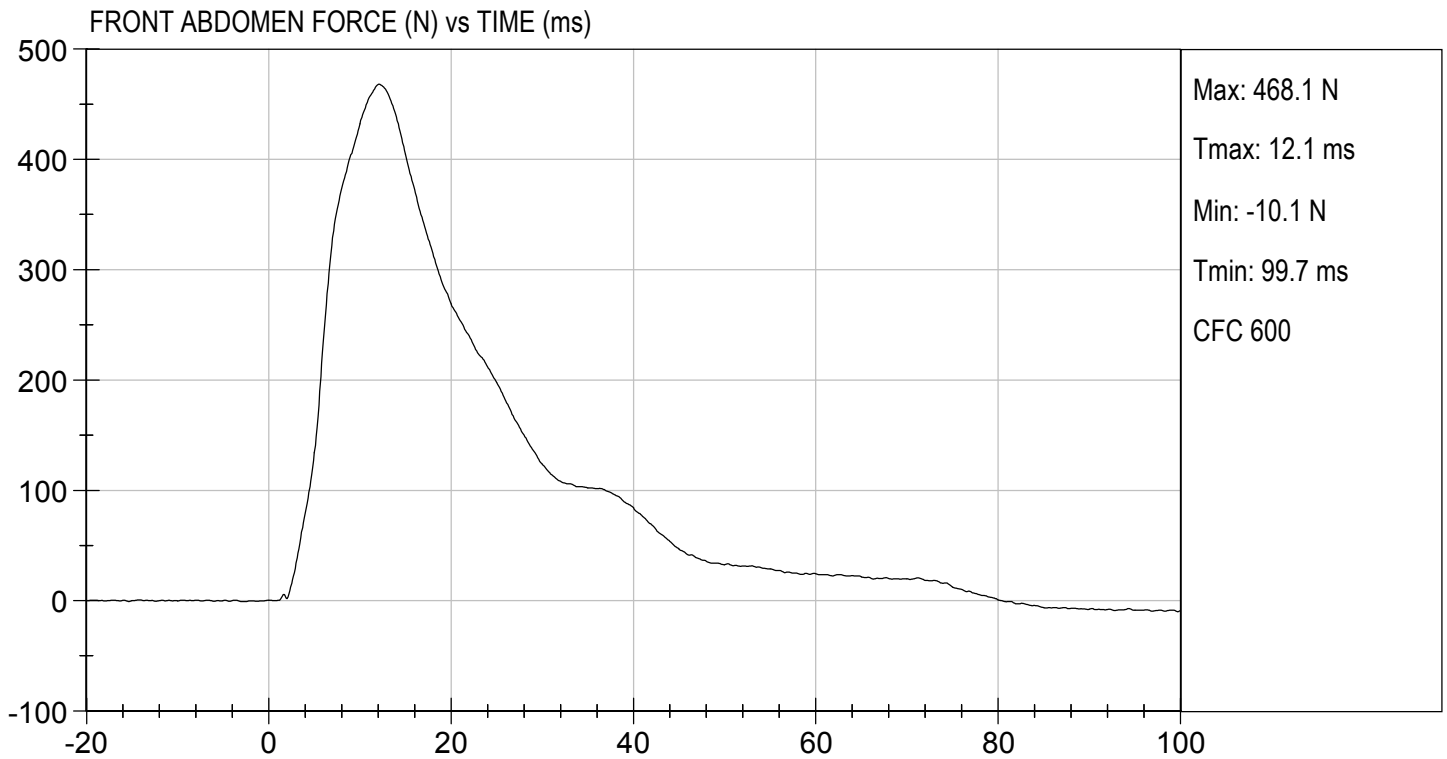
Approved By

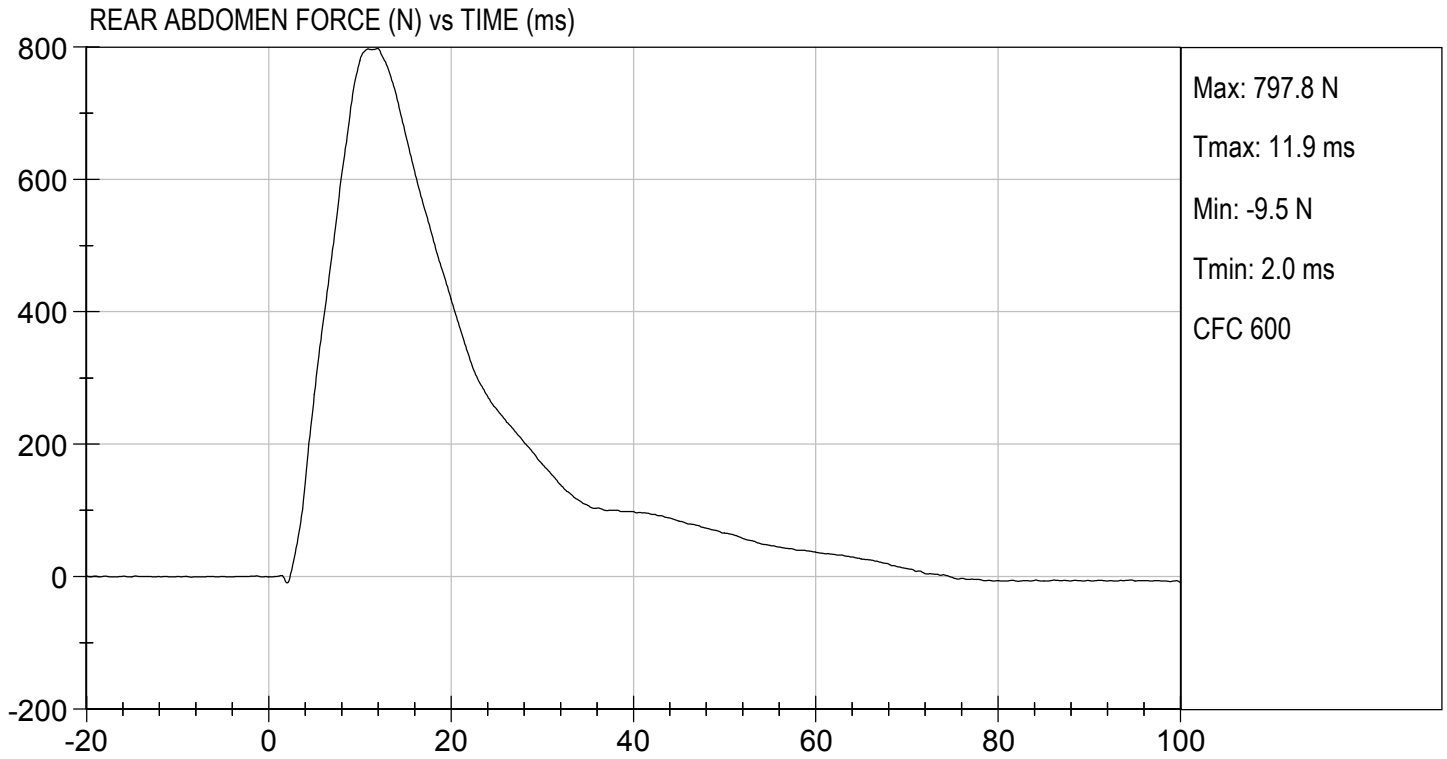


TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 10/03/2017
TEST #: D172807







MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
ES-2re DUMMY

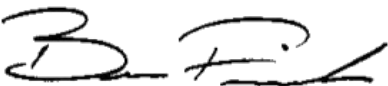
ATD Serial No: 032

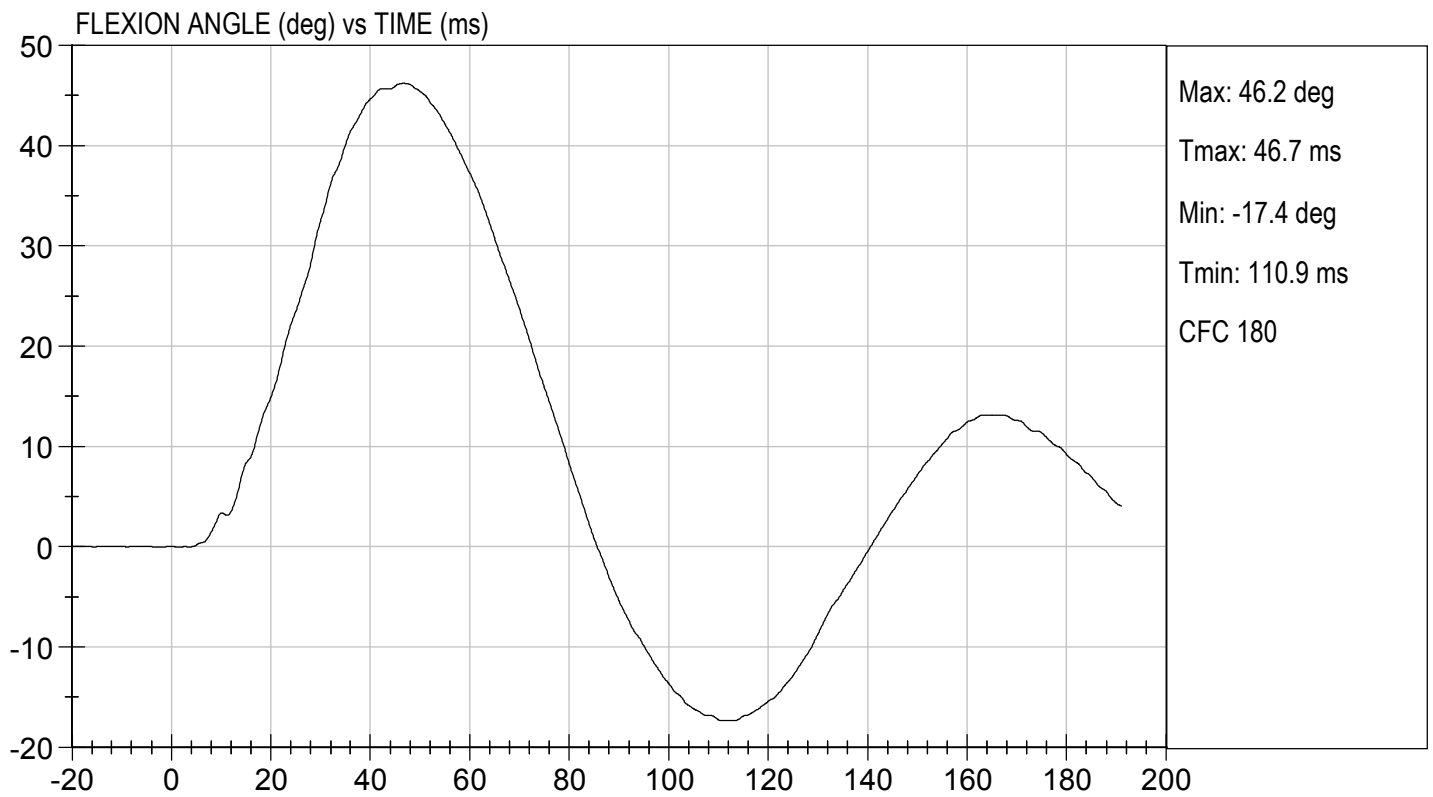
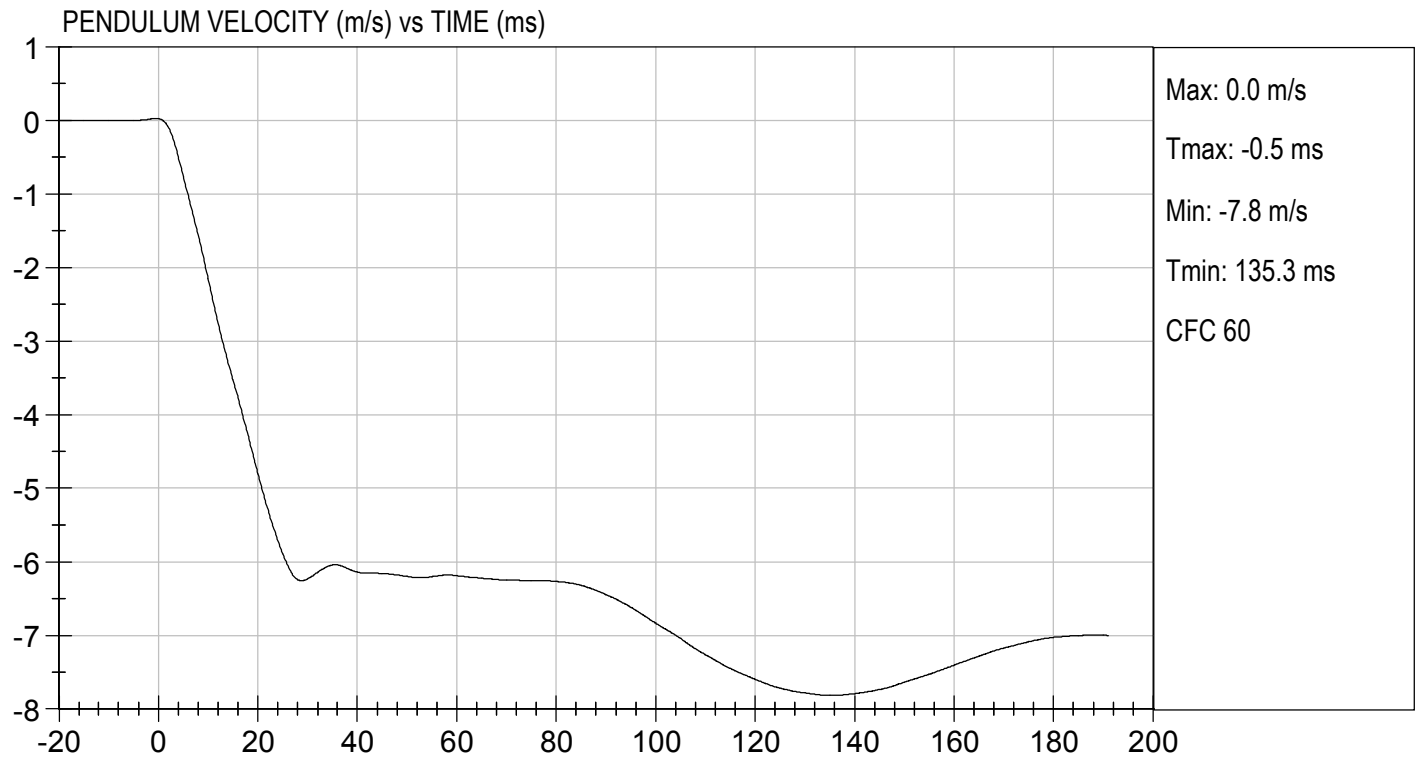
Test I.D: D172808

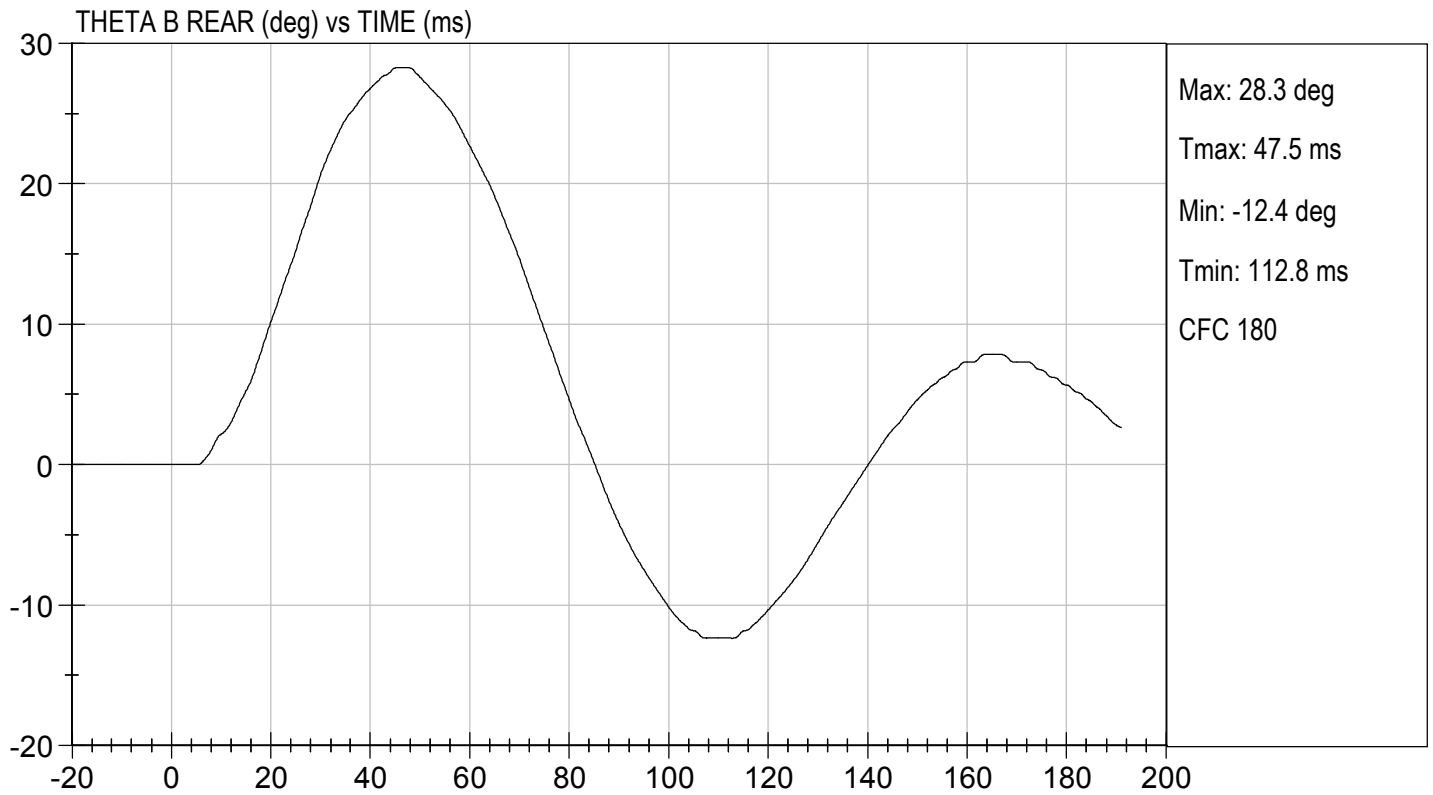
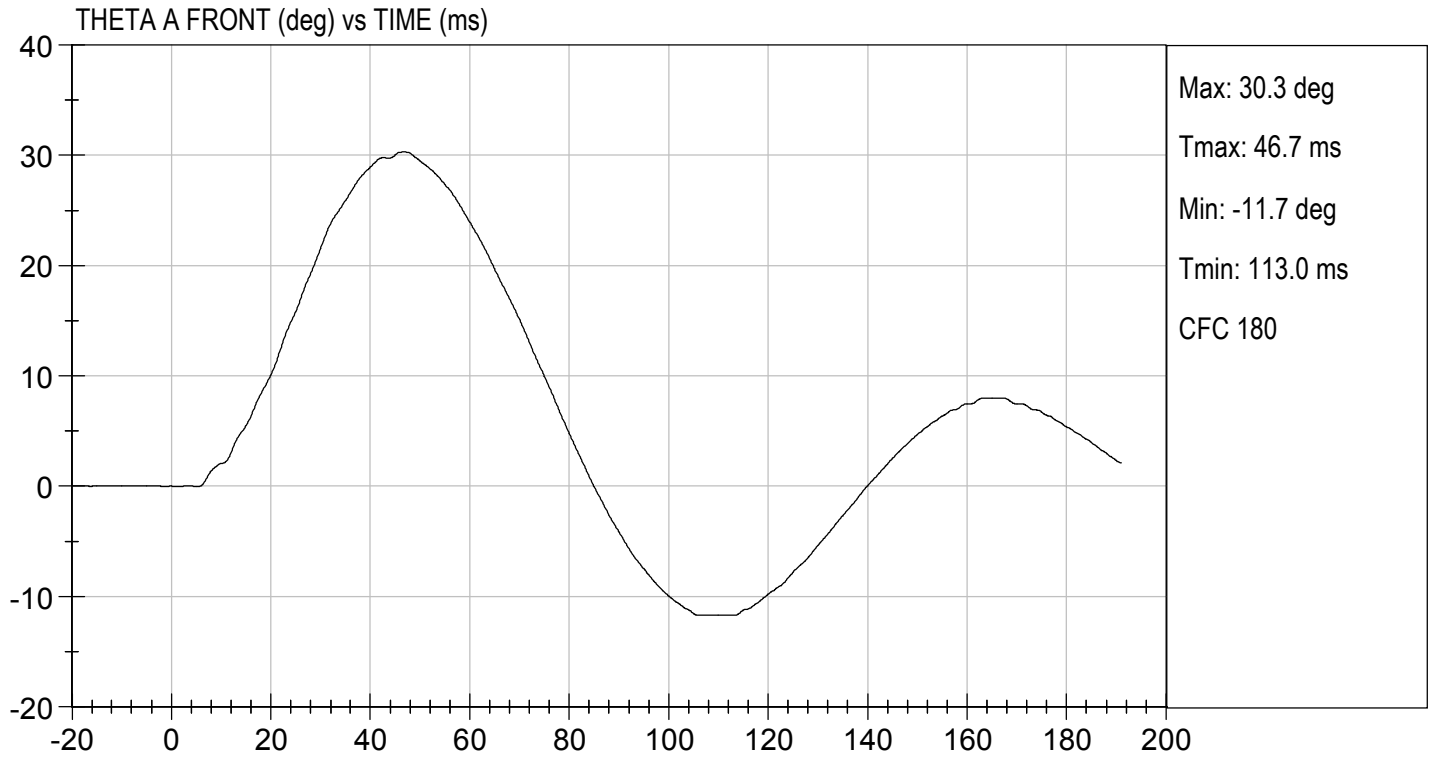
| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|---|--------|---------------|-----------------|-------------|------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 20.7 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 52 | Pass | |
| Pendulum Speed | m/s | 5.95 to 6.15 | 6.12 | Pass | |
| Pendulum Velocity | 1 ms | m/s | -0.05 to 0.00 | -0.01 | Pass |
| | 3.7 ms | m/s | -0.425 to -0.24 | -0.418 | Pass |
| | 27 ms | m/s | -6.50 to -5.80 | -6.17 | Pass |
| | 30 ms | m/s | >= -6.50 | -6.23 | Pass |
| Maximum Flexion Angle | deg | 45.0 to 55.0 | 46.2 | Pass | |
| Time of Maximum Flexion Angle | ms | 39.0 to 53.0 | 46.7 | Pass | |
| Headform Rotation Decay to Initial Position | ms | 37 to 57 | 48 | Pass | |
| Overall Results | | | | Pass | |

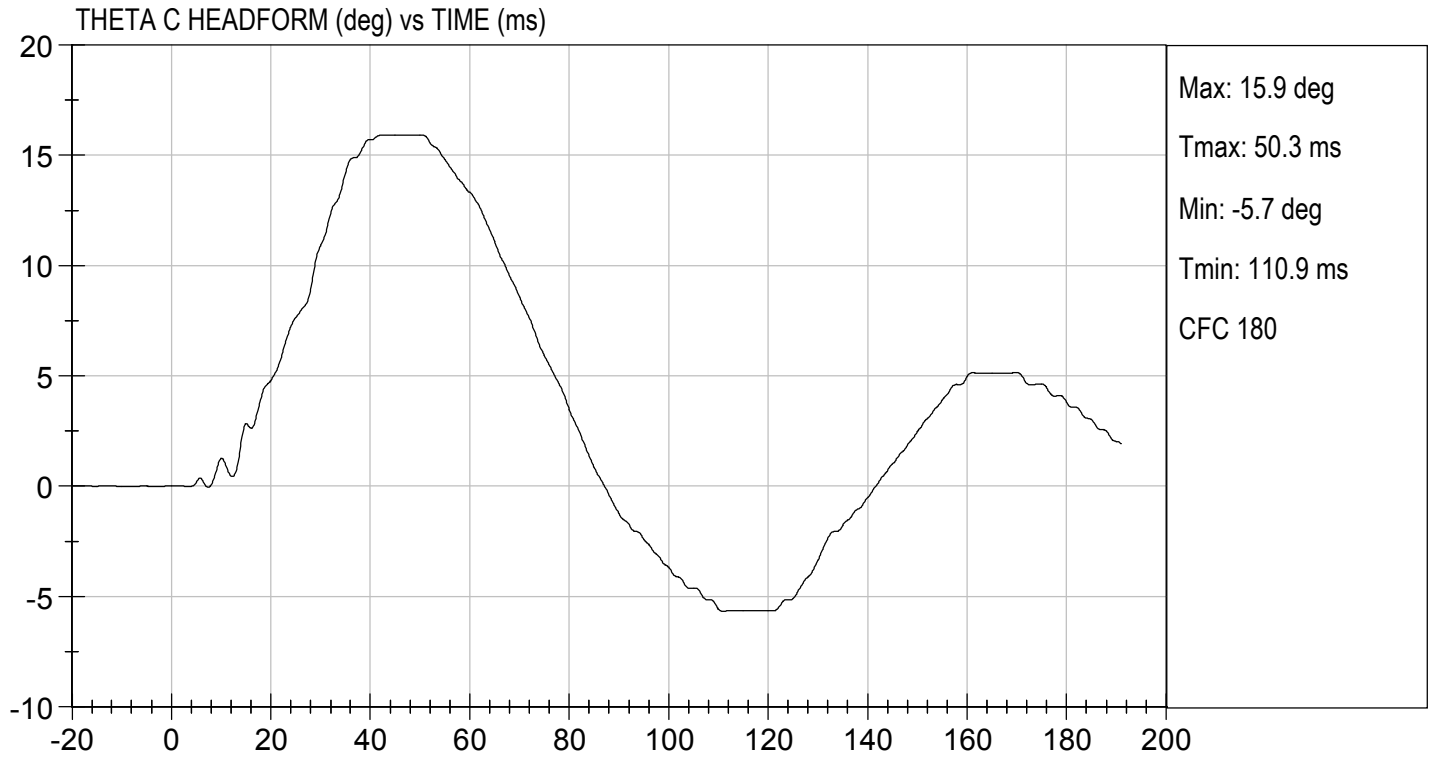

 Laboratory Technician

10/02/2017
 Test Date


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MGA RESEARCH CORPORATION

**PELVIS TEST
ES-2re DUMMY**

ATD Serial No: 032

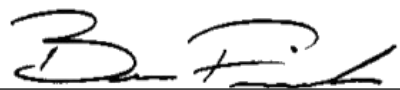
Test I.D: D172809

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 57 | Pass |
| Probe Speed | m/s | 4.20 to 4.40 | 4.27 | Pass |
| Maximum Impactor Force | N | 4700 to 5400 | 4706 | Pass |
| Time of Maximum Impactor Force | ms | 11.8 to 16.1 | 13.5 | Pass |
| Maximum Pubic Force | N | 1230 to 1590 | 1257 | Pass |
| Time of Maximum Pubic Force | ms | 12.2 to 17.0 | 15.1 | Pass |
| Overall Test Results | | | | Pass |

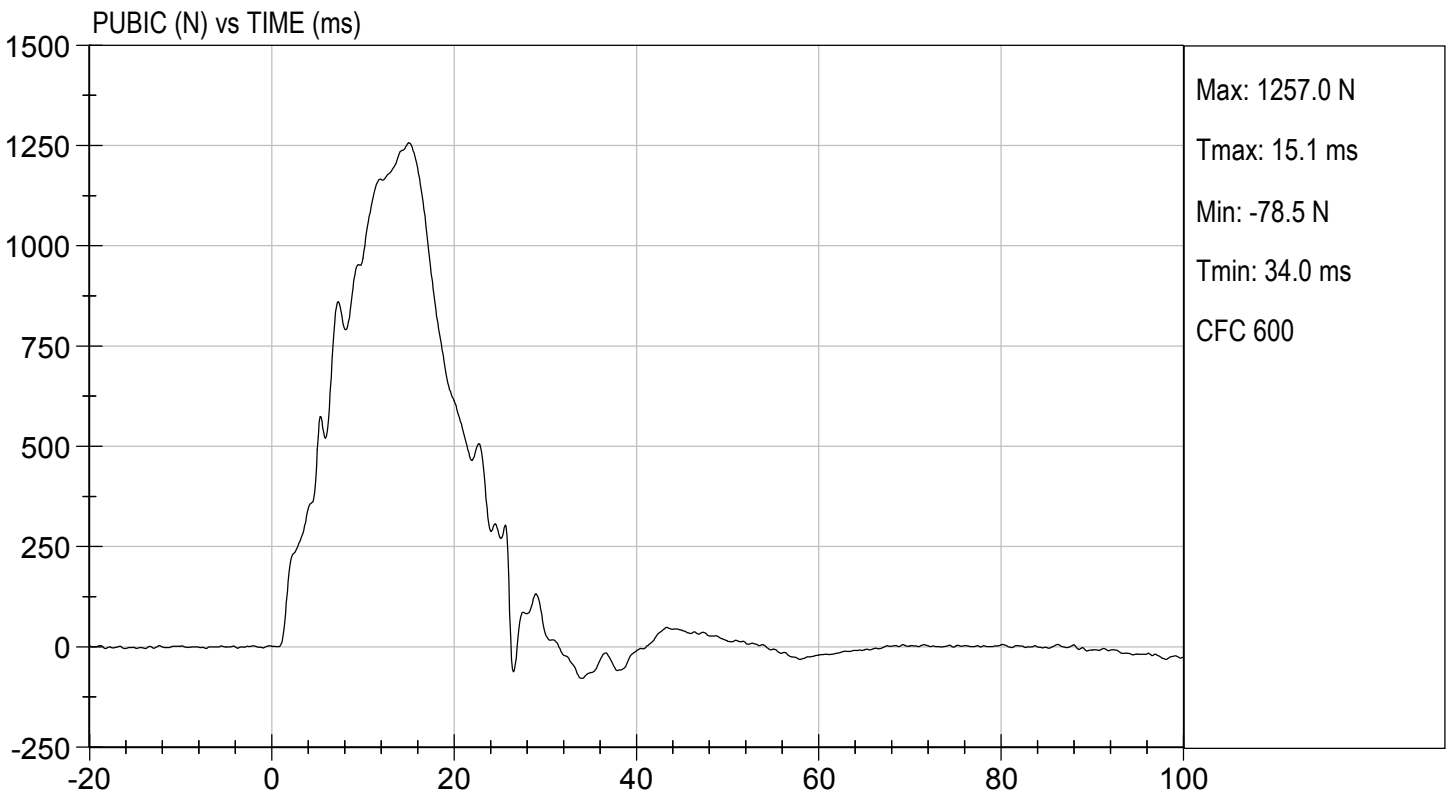
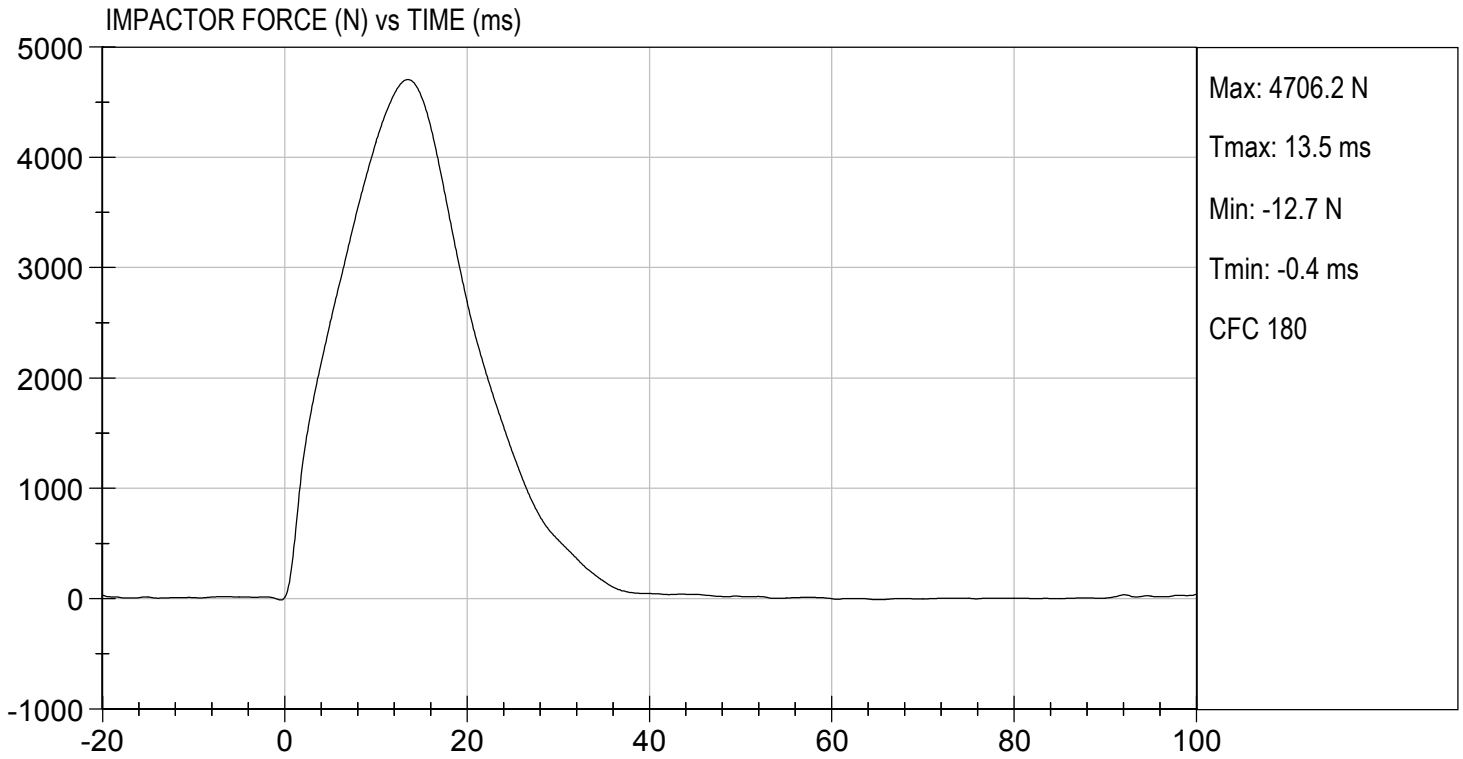


Laboratory Technician

10/03/2017
Test Date



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MGA RESEARCH CORPORATION
THORAX IMPACT TEST
ES-2re DUMMY

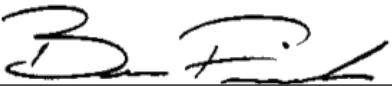
ATD Serial No: 032

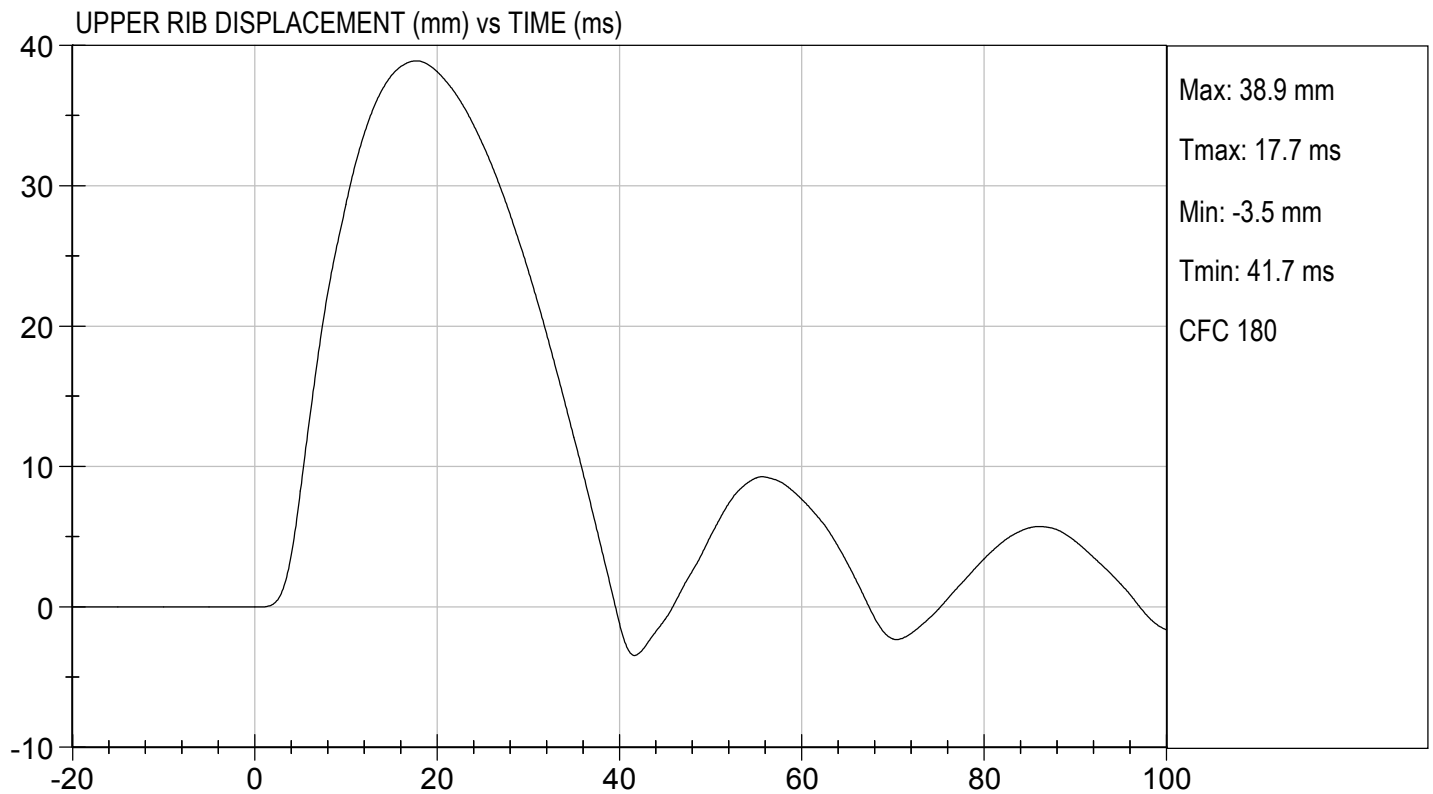
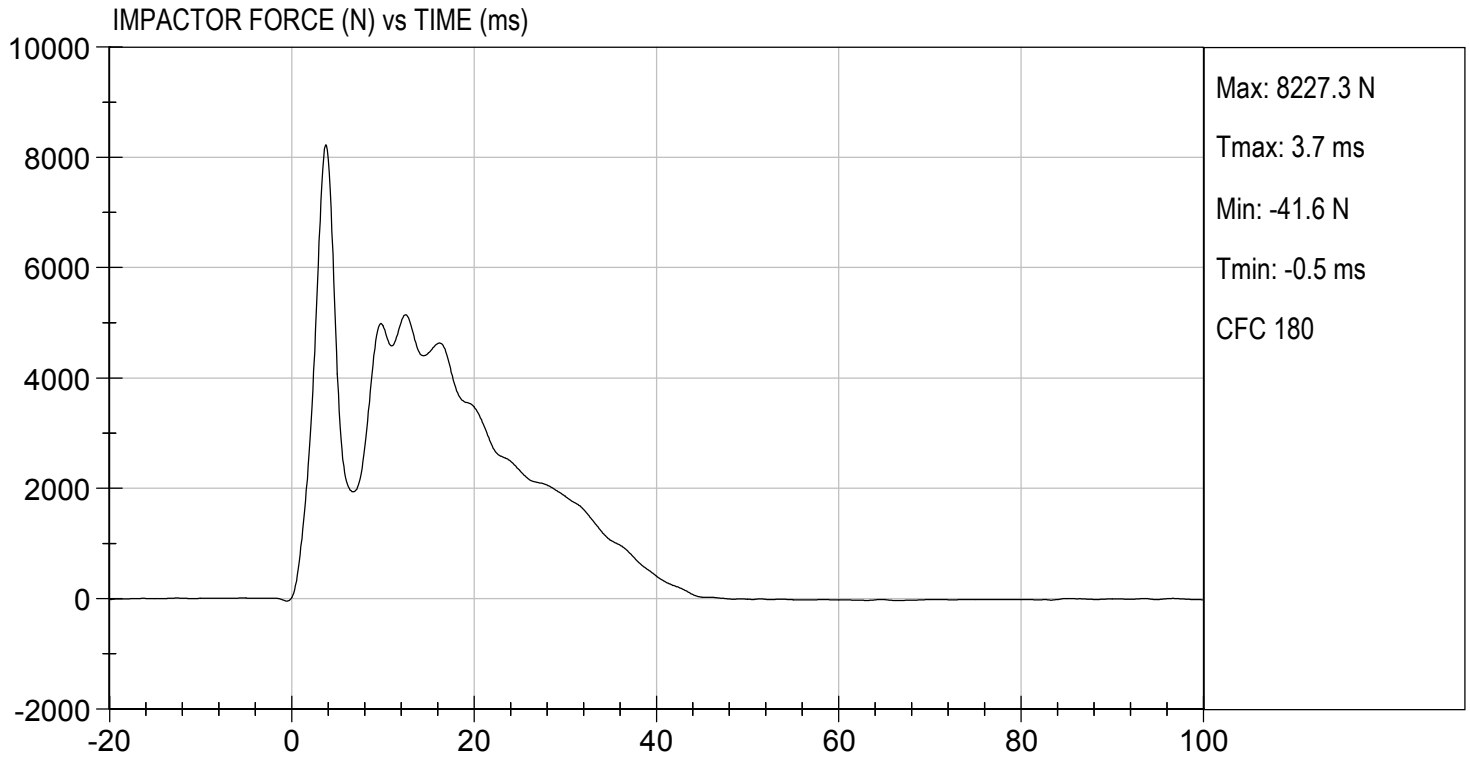
Test I.D: D172800

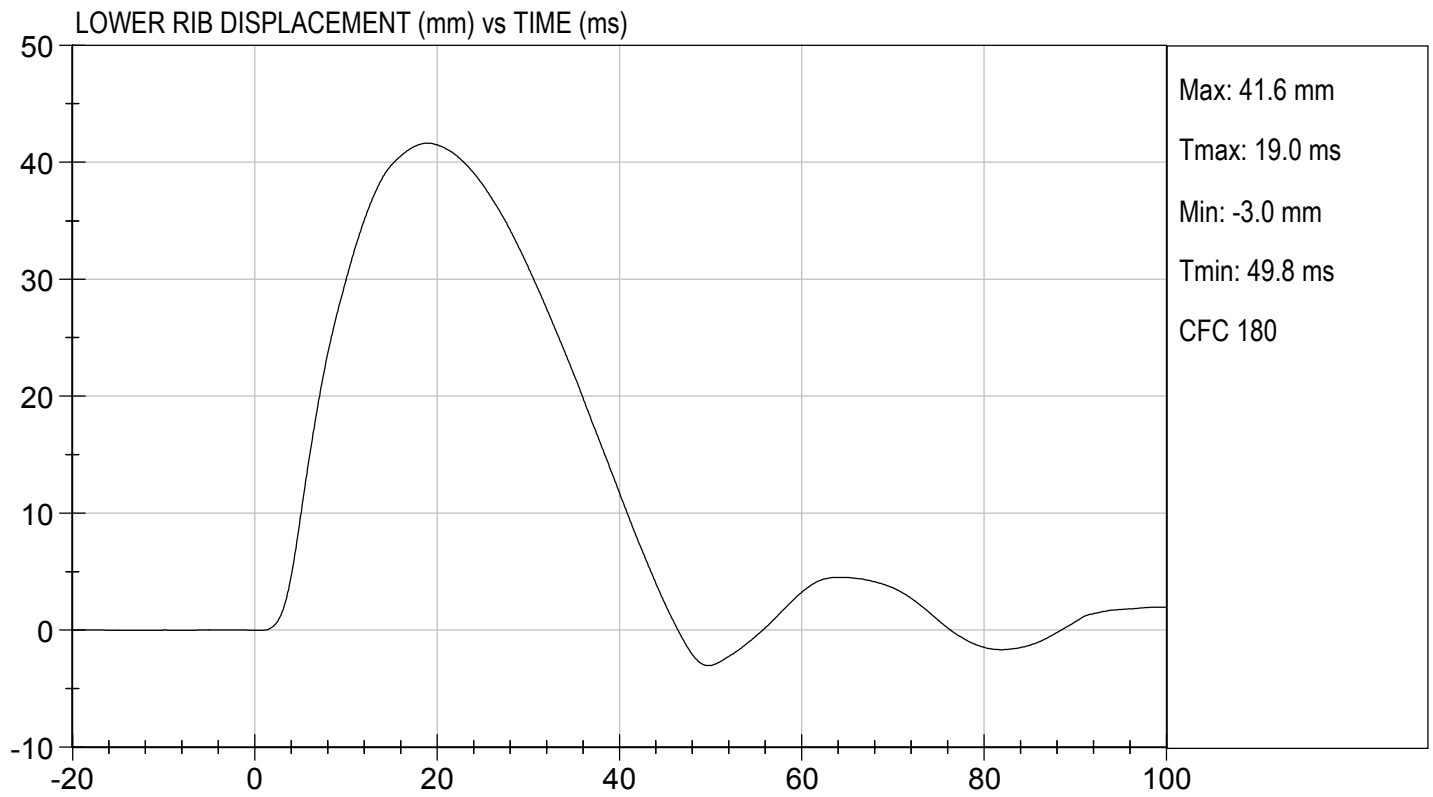
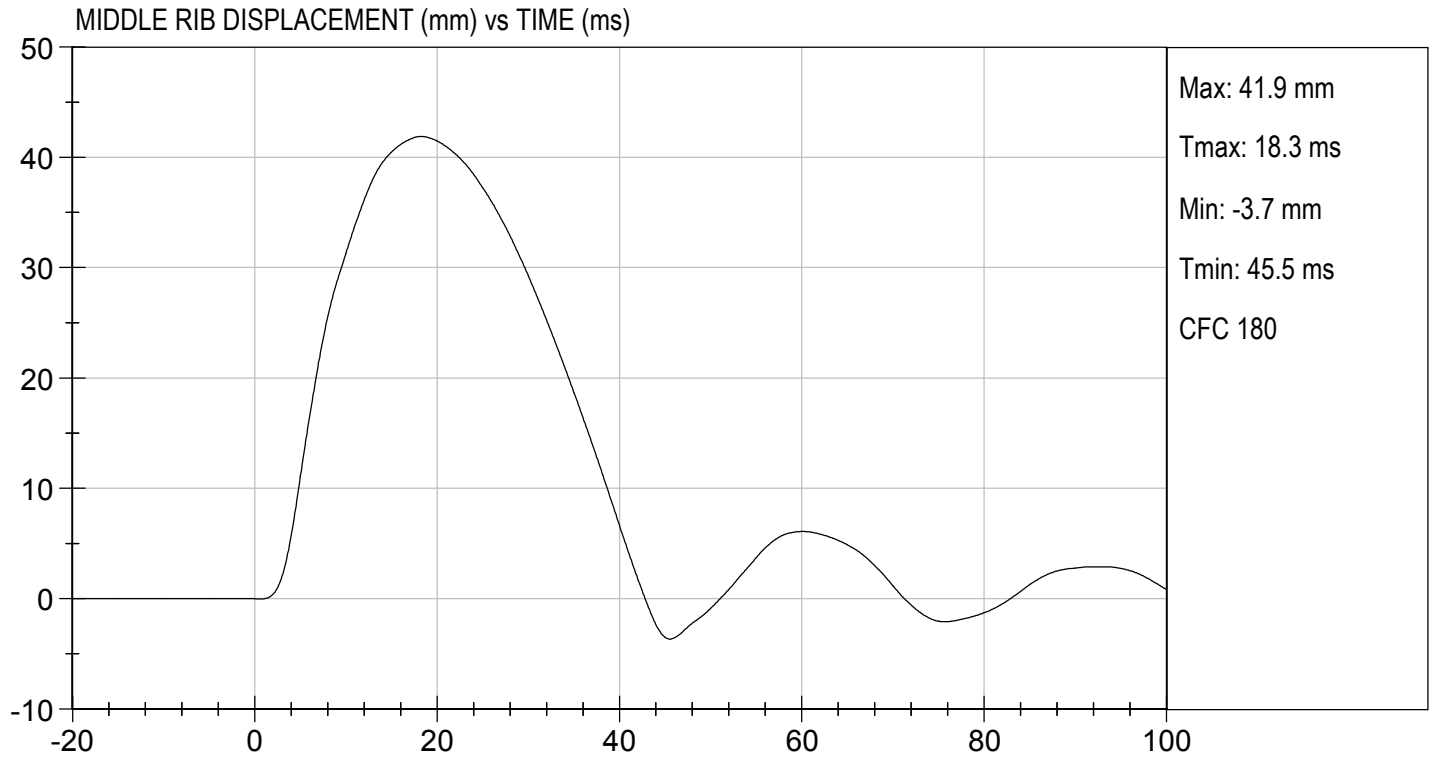
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|-------------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.1 | Pass |
| Humidity | % | 10 to 70 | 57 | Pass |
| Probe Speed | m/s | 5.40 to 5.60 | 5.58 | Pass |
| Maximum Impactor Force (after 6 ms) | N | 5100 to 6200 | 5147 | Pass |
| Upper Rib Displacement | mm | 34.0 to 41.0 | 38.9 | Pass |
| Middle Rib Displacement | mm | 37.0 to 45.0 | 41.9 | Pass |
| Lower Rib Displacement | mm | 37.0 to 44.0 | 41.6 | Pass |
| Overall Test Results | | | | Pass |


 Laboratory Technician

10/03/2017
 Test Date


 Approved By





**ES-2re External Measurements
SN: 032**

| No. | Name | Spec. (mm) | Result | Pass/Fail |
|------------|--|-------------------|---------------|------------------|
| 1 | Sitting Height | 900 - 918 | 915 | Pass |
| 2 | Seat to Shoulder Joint | 558 - 572 | 568 | Pass |
| 3 | Seat to Lower Face of Thoracic Spine Box | 346 - 356 | 355 | Pass |
| 4 | Seat to Hip Joint (center of bolt) | 97 - 103 | 98 | Pass |
| 5 | Sole to Seat, Sitting | 333 - 451 | 440 | Pass |
| 6 | Head Width | 152 - 158 | 157 | Pass |
| 7 | Shoulder/Arm Width | 461 - 479 | 464 | Pass |
| 8 | Thorax Width | 322 - 332 | 323 | Pass |
| 9 | Abdomen Width | 273 - 287 | 281 | Pass |
| 10 | Pelvis Lap Width | 359 - 373 | 370 | Pass |
| 11 | Head Depth | 196 - 206 | 203 | Pass |
| 12 | Thorax Depth | 262 - 272 | 264 | Pass |
| 13 | Abdomen Depth | 194 - 204 | 196 | Pass |
| 14 | Pelvis Depth | 235 - 245 | 236 | Pass |
| 15 | Back of Buttocks to Hip Joint (center of bolt) | 150 - 160 | 151 | Pass |
| 16 | Back of Buttocks to Front Knee | 597 - 615 | 607 | Pass |

MGA RESEARCH CORPORATION
HEAD DROP TEST
ES-2re DUMMY

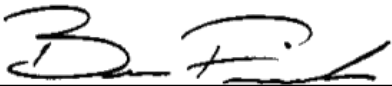
ATD Serial No: 032

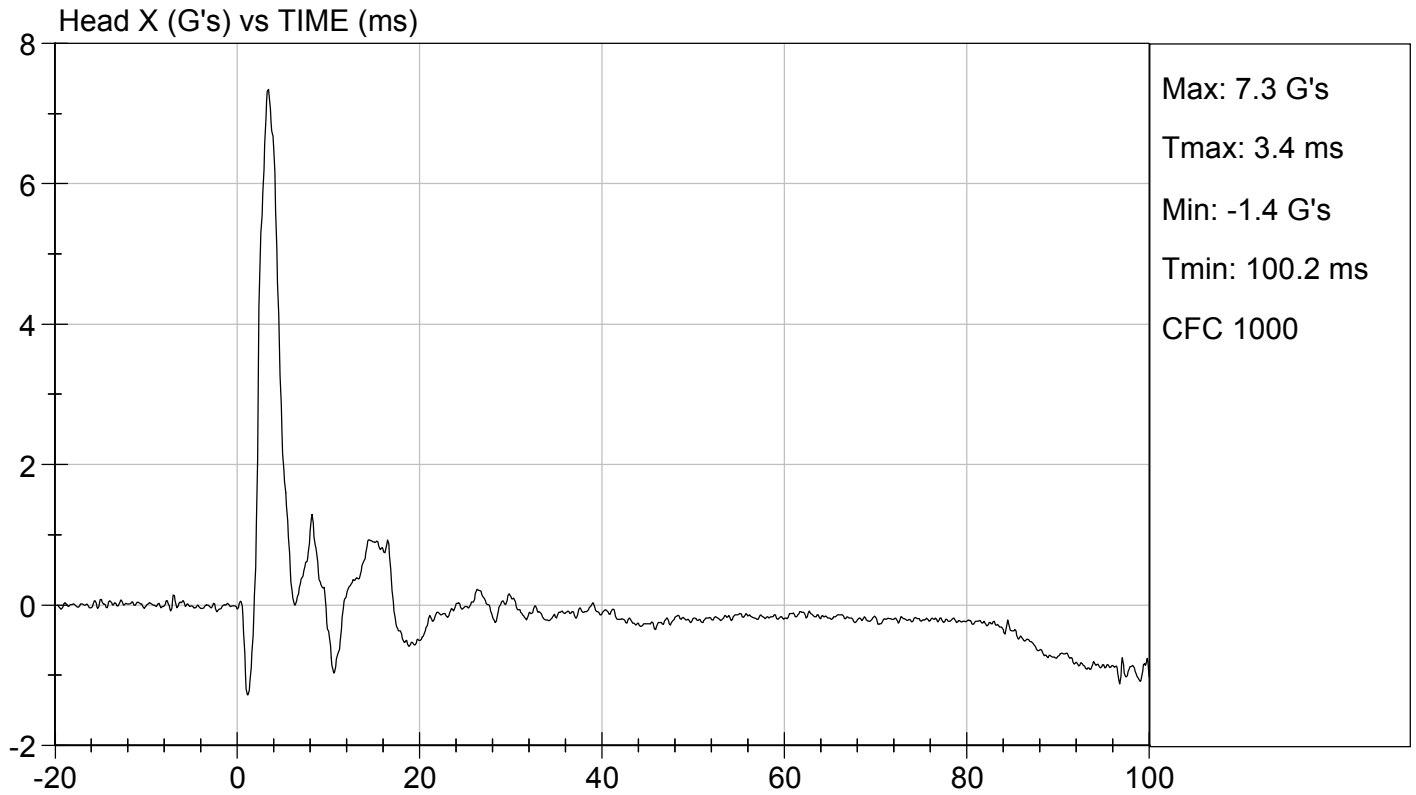
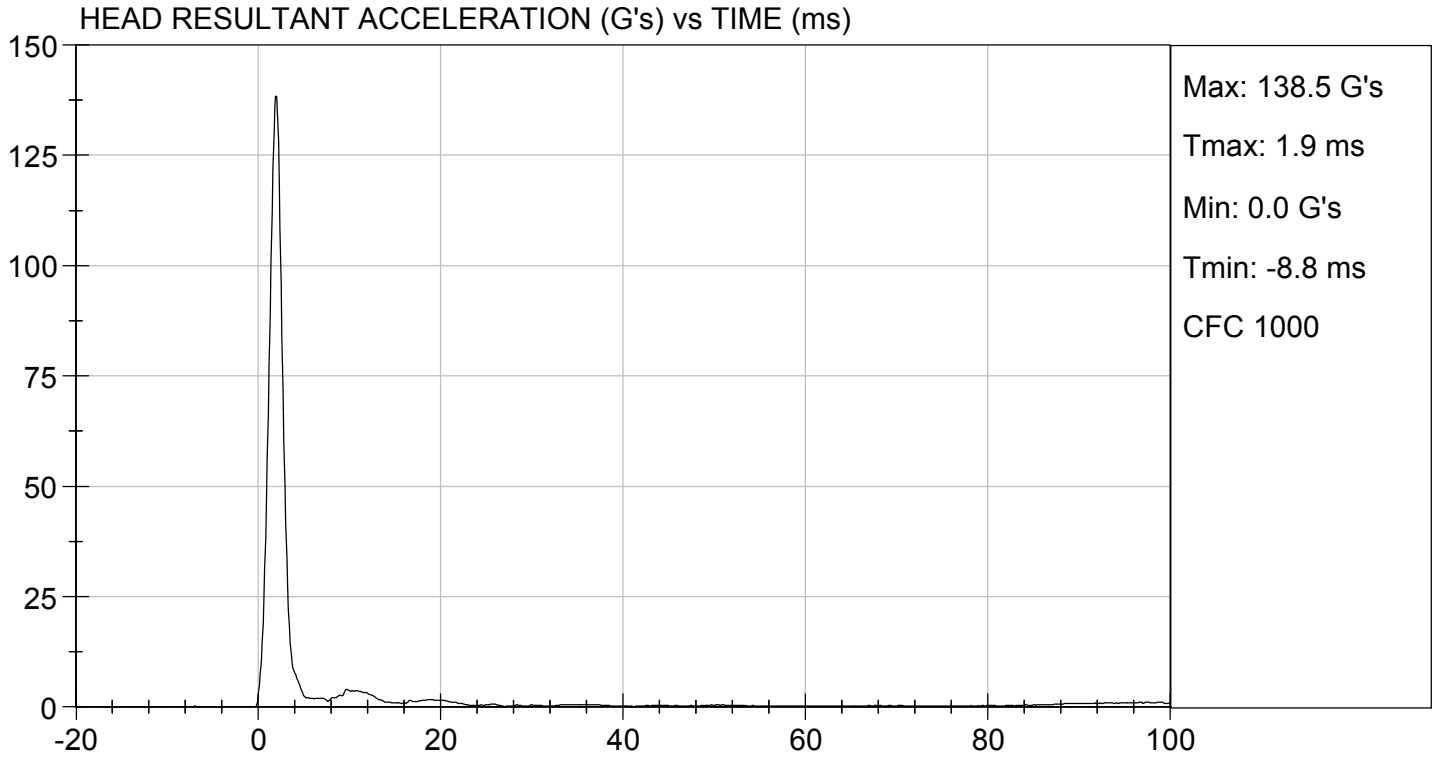
Test ID: D173071

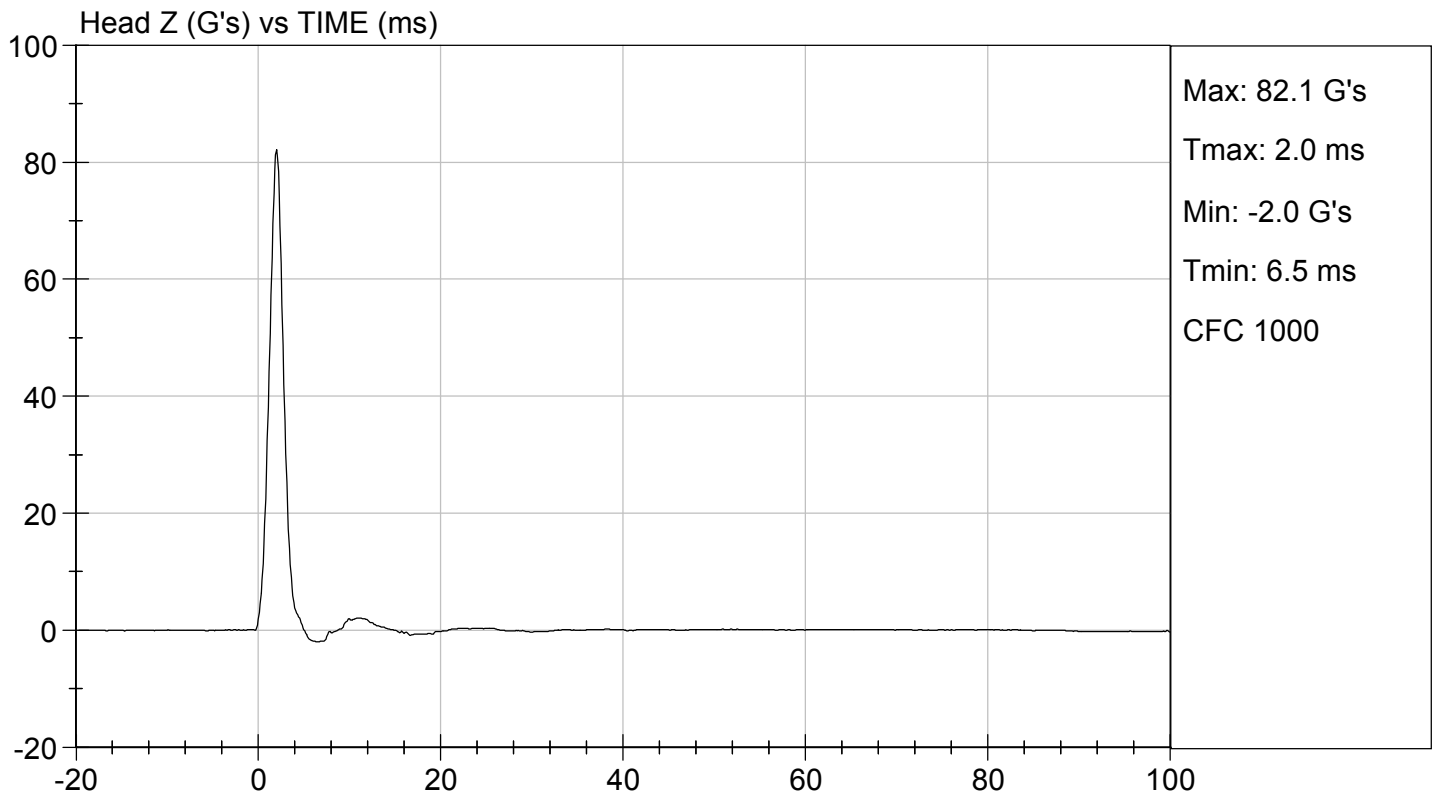
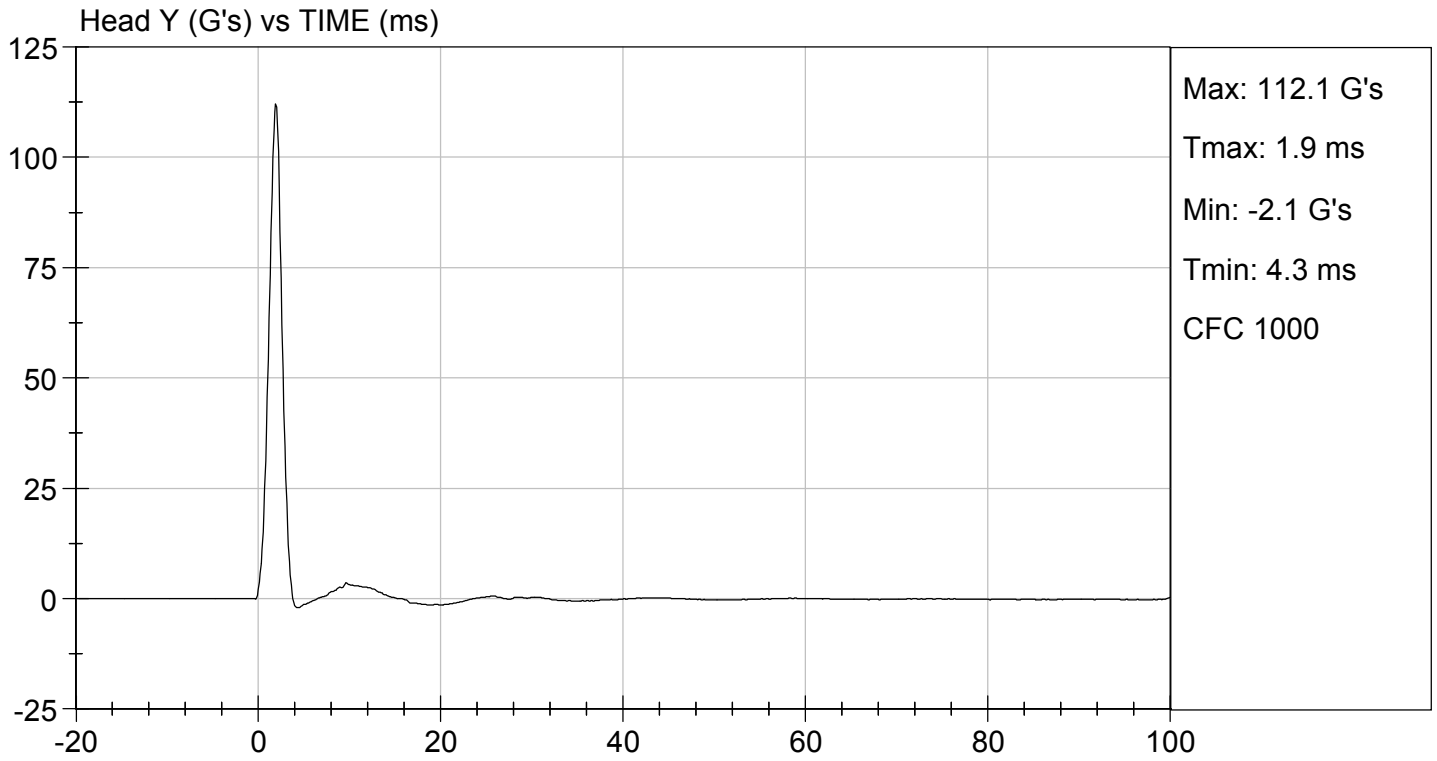
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|--------------------|--------|-----------|
| Laboratory Temperature | deg C | 18.9 to 25.6 | 22.0 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 39 | Pass |
| Peak Resultant Acceleration | G's | 125 to 155 | 138 | Pass |
| Peak Longitudinal Acceleration | G's | <= +/- 15.0 | 7.3 | Pass |
| Unimodal | N/A | Yes | Yes | Pass |
| Oscillations | N/A | within 15% of peak | Yes | Pass |
| Overall Test Results | | | | Pass |


 Laboratory Technician

10/24/2017
 Test Date


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NECK PENDULUM TEST
ES-2re DUMMY

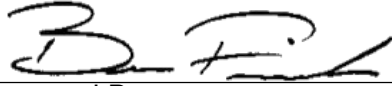
ATD Serial No: 032

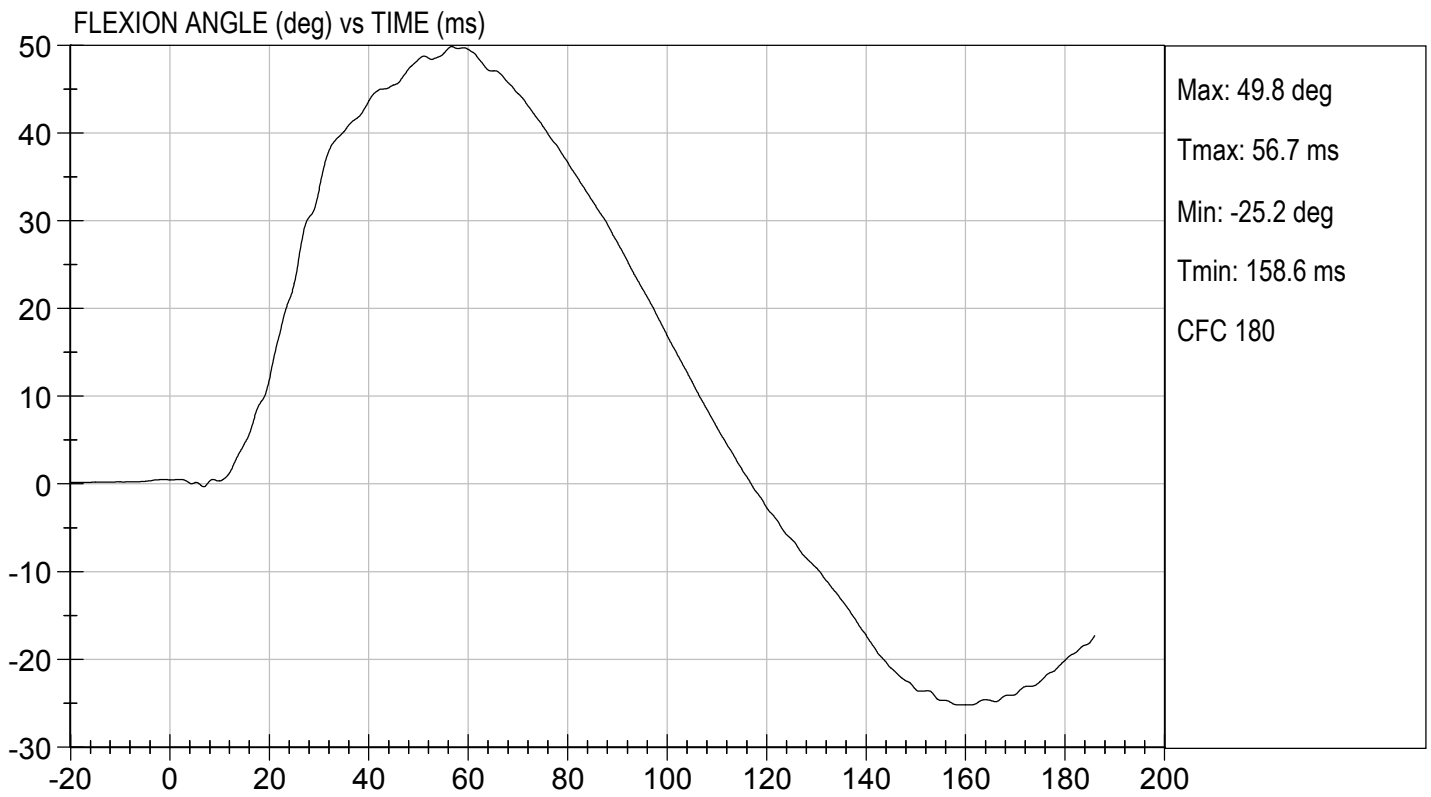
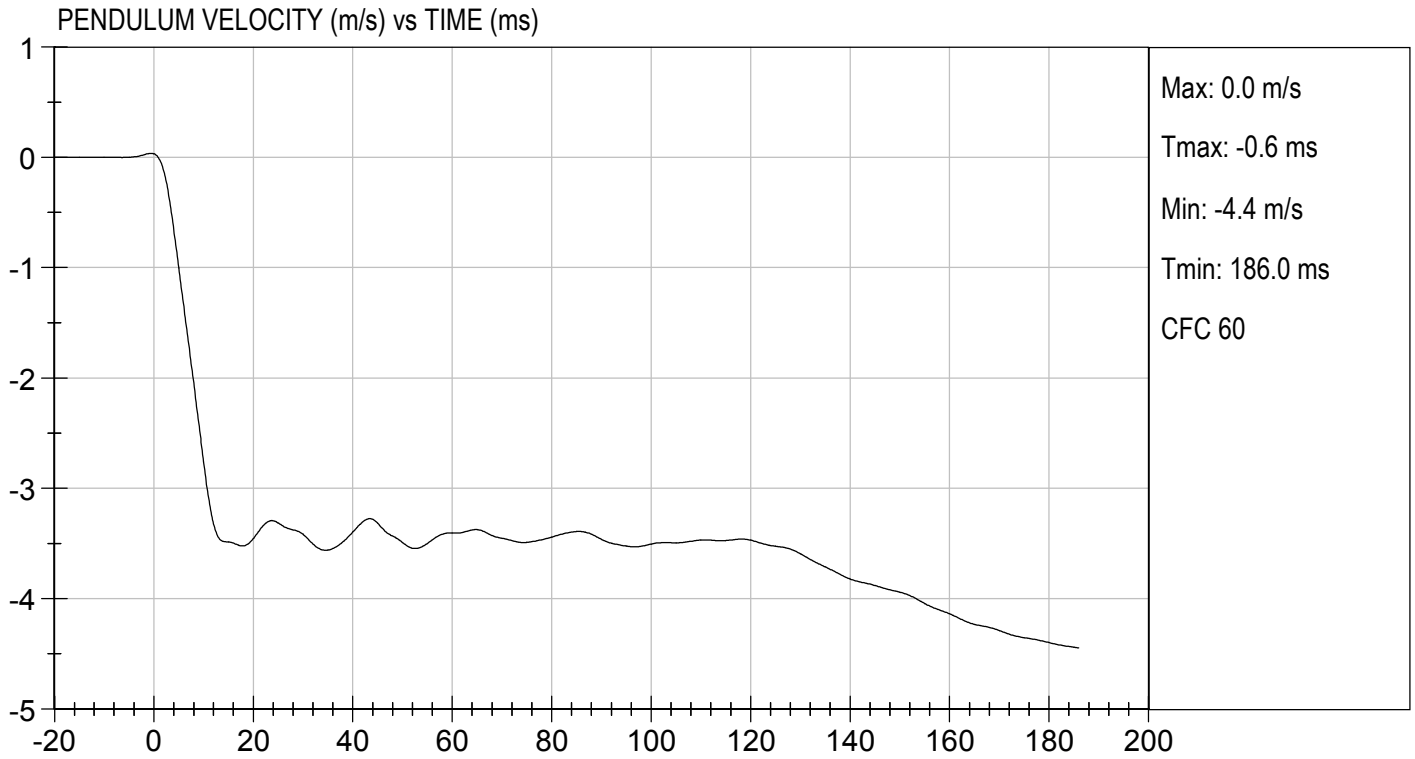
Test I.D.: D173072

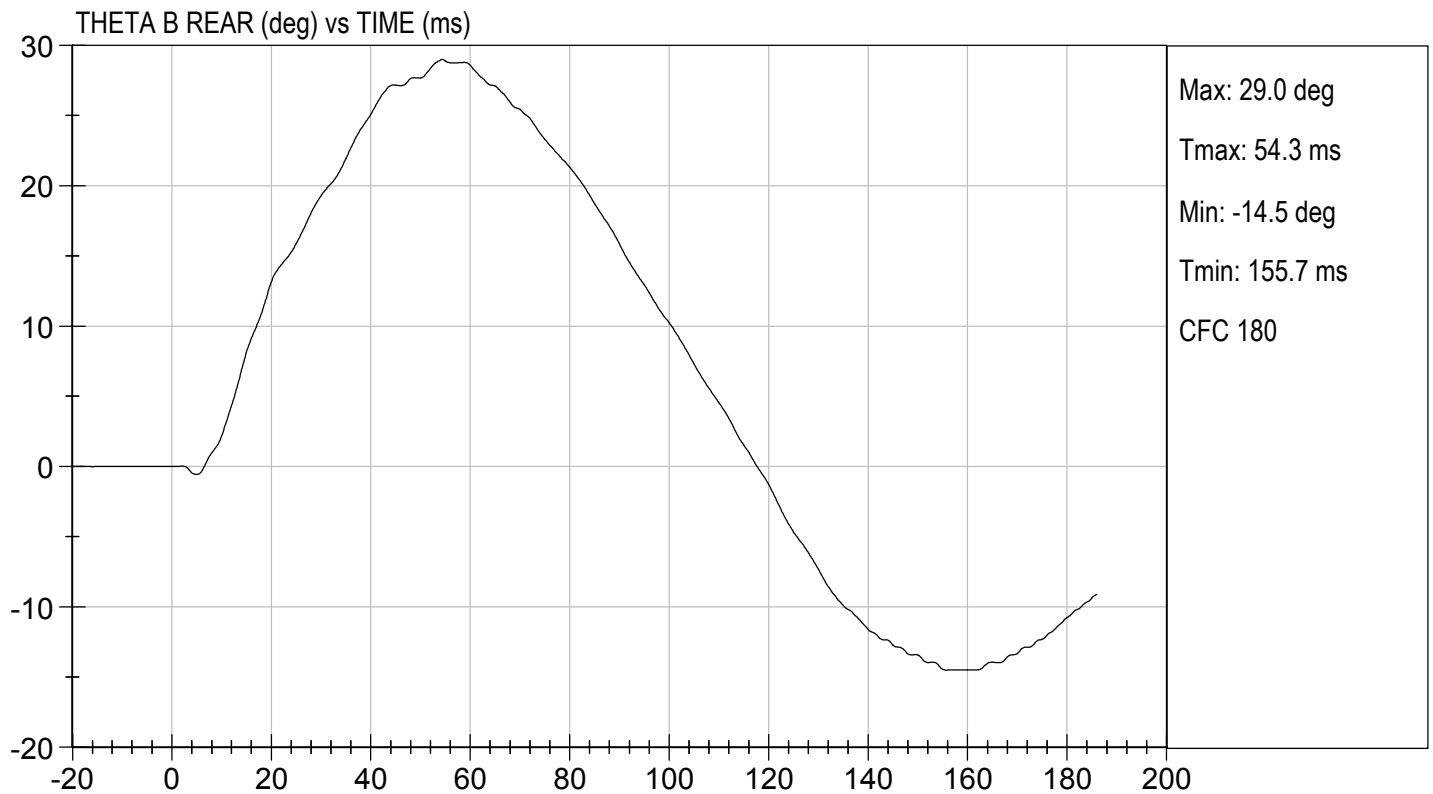
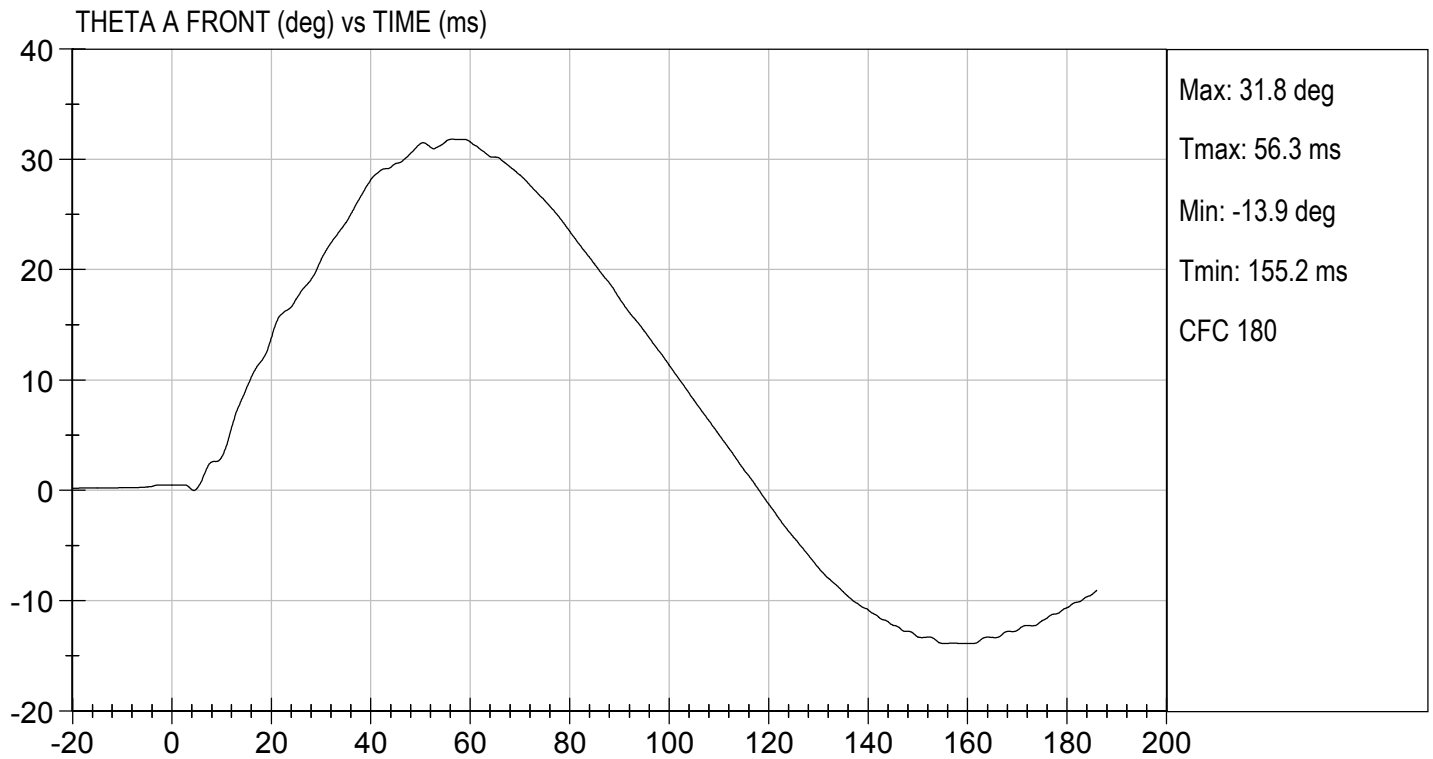
| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|--------------------------------------|-------|---------------|-----------------|-------------|------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.7 | Pass | |
| Laboratory Relative Humidity | % | 10 to 70 | 42 | Pass | |
| Pendulum Speed | m/s | 3.30 to 3.50 | 3.48 | Pass | |
| Pendulum Velocity | 1 ms | m/s | -0.05 to 0.00 | -0.01 | Pass |
| | 3 ms | m/s | -0.25 to -0.375 | -0.35 | Pass |
| | 14 ms | m/s | -3.20 to -3.70 | -3.48 | Pass |
| | 17 ms | m/s | >= -3.70 | -3.52 | Pass |
| Maximum Flexion Angle | deg | 49.0 to 59.0 | 49.8 | Pass | |
| Time of Maximum Flexion Angle | ms | 54.0 to 66.0 | 56.7 | Pass | |
| Head Rotation Decay Time to 0 Degree | ms | 53.0 to 88.0 | 54.3 | Pass | |
| Overall Results | | | | Pass | |

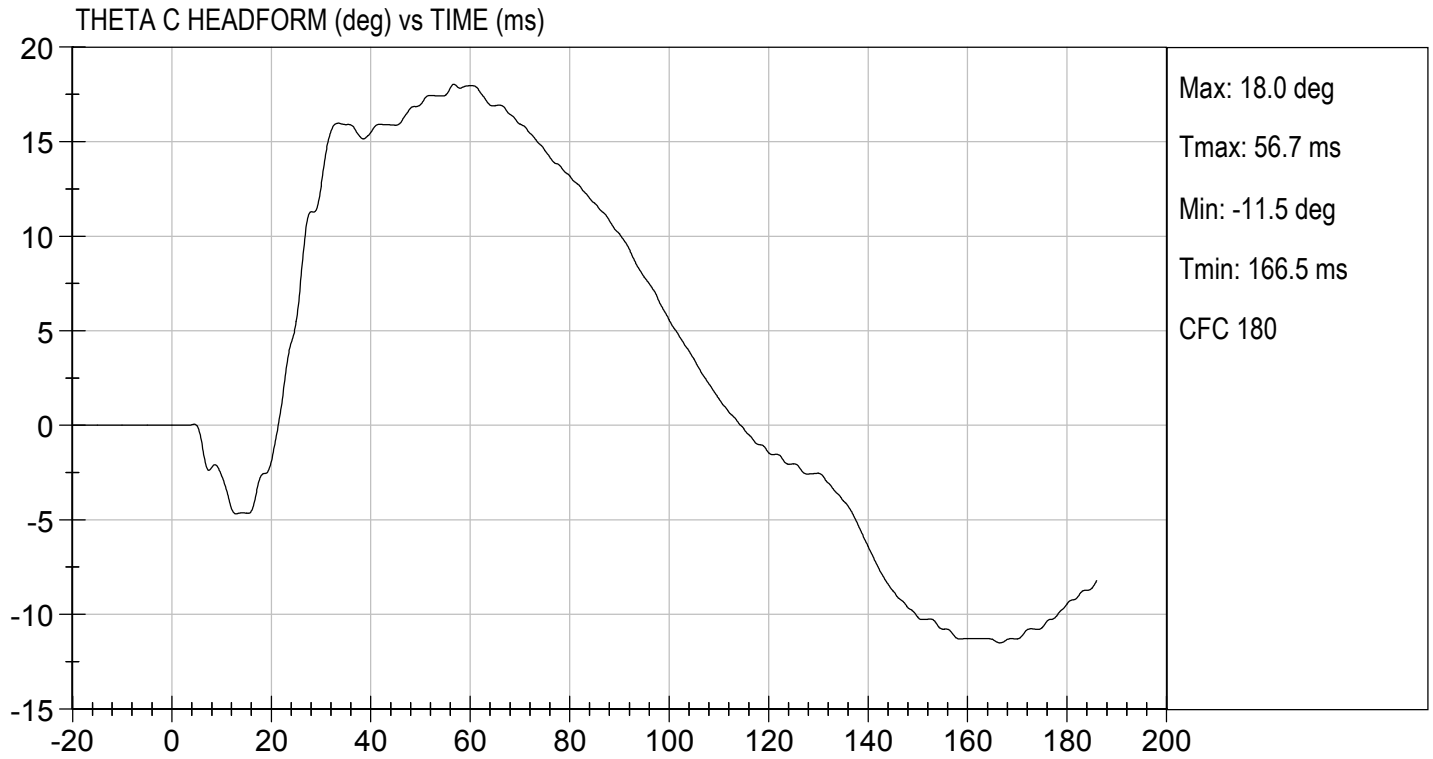

 Laboratory Technician

10/23/2017
 Test Date


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MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
ES-2re DUMMY

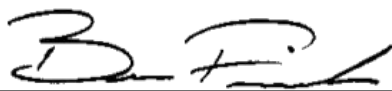
ATD Serial No: 032

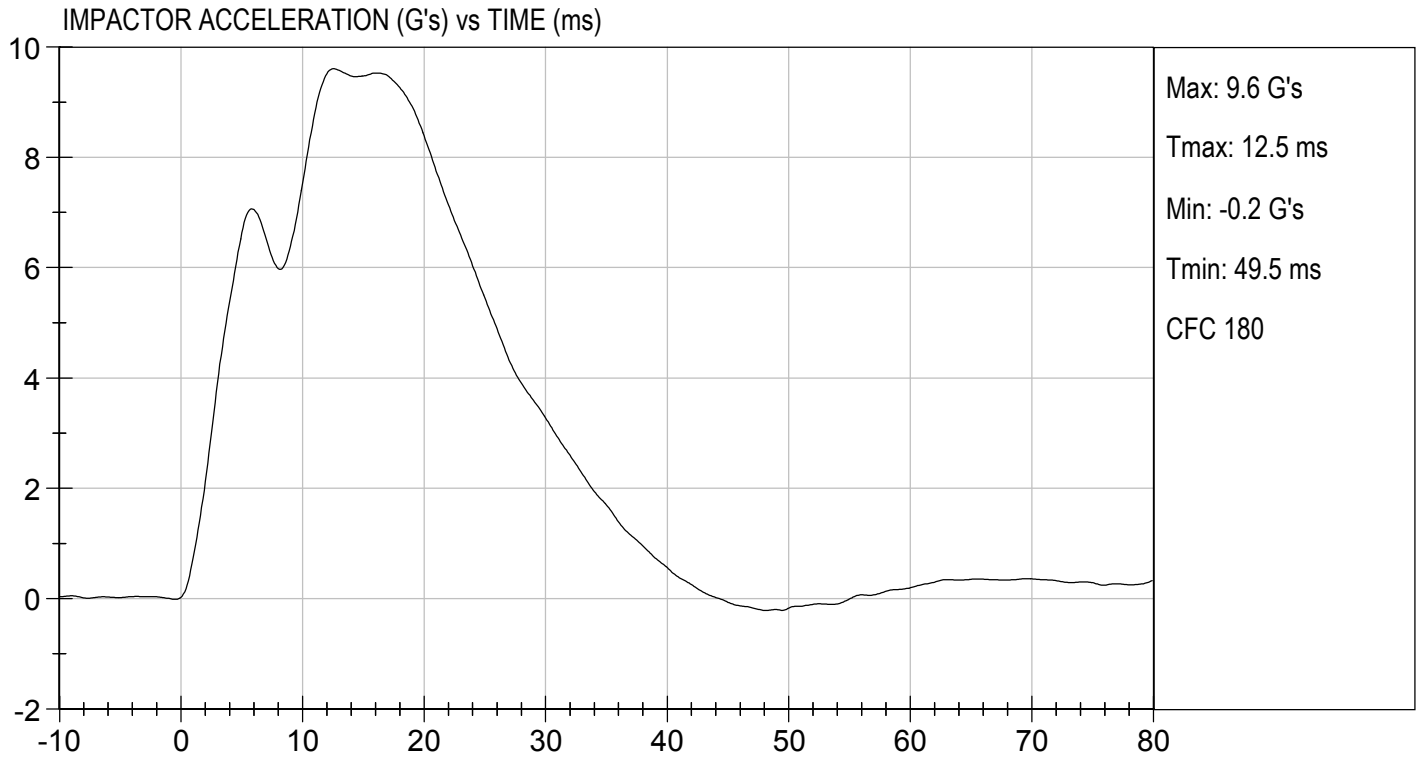
Test I.D: D173073

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.3 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 42 | Pass |
| Pendulum Speed | m/s | 4.20 to 4.40 | 4.2 | Pass |
| Peak Impactor Acceleration | G's | 7.5 to 10.5 | 9.6 | Pass |
| Overall Test Results | | | | Pass |


 Laboratory Technician

10/24/2017
 Test Date


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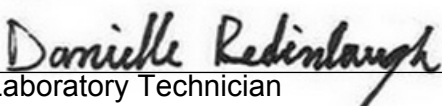
UPPER RIB TEST

ES-2re DUMMY

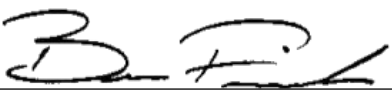
ATD Serial No: 032

Test I.D: D173074

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.3 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 42 | Pass |
| Displacement at 459 mm | mm | 36.0 to 40.0 | 38.0 | Pass |
| Displacement at 815 mm | mm | 46.0 to 51.0 | 49.0 | Pass |
| Overall Test Results | | | | Pass |

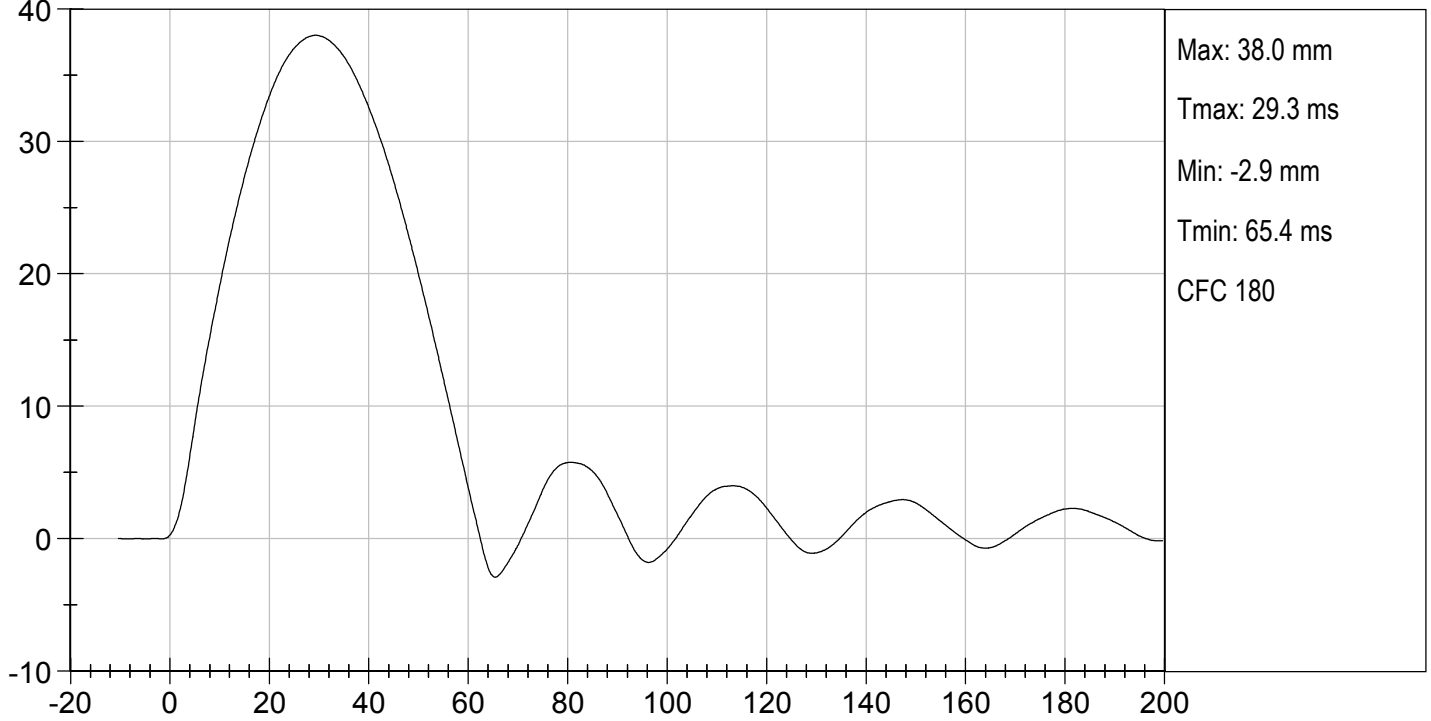

Laboratory Technician

10/23/2017
Test Date

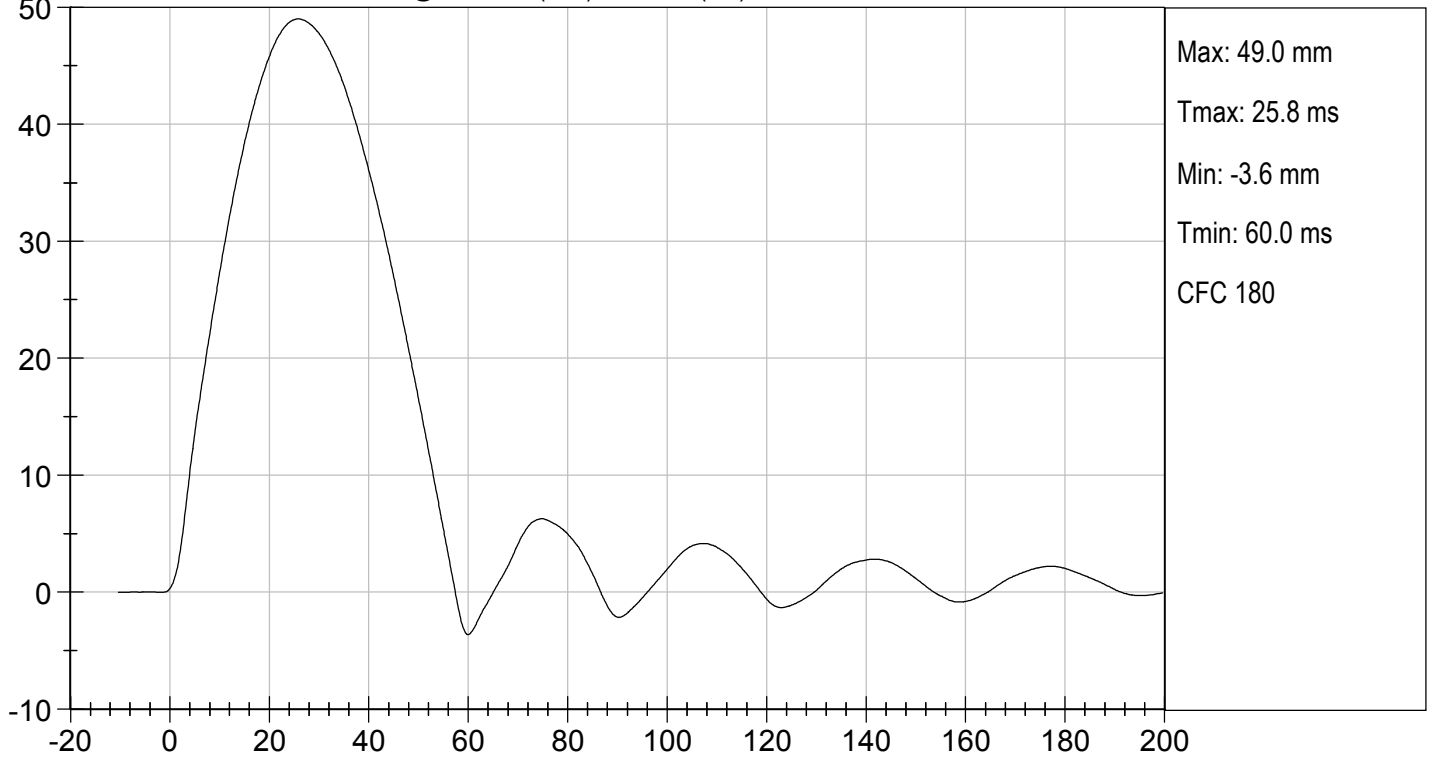

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UPPER RIB DISPLACEMENT @ 459 mm (mm) vs TIME (ms)



UPPER RIB DISPLACEMENT @ 815 mm (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

MID RIB TEST

ES-2re DUMMY

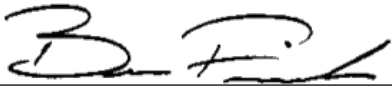
ATD Serial No: 032

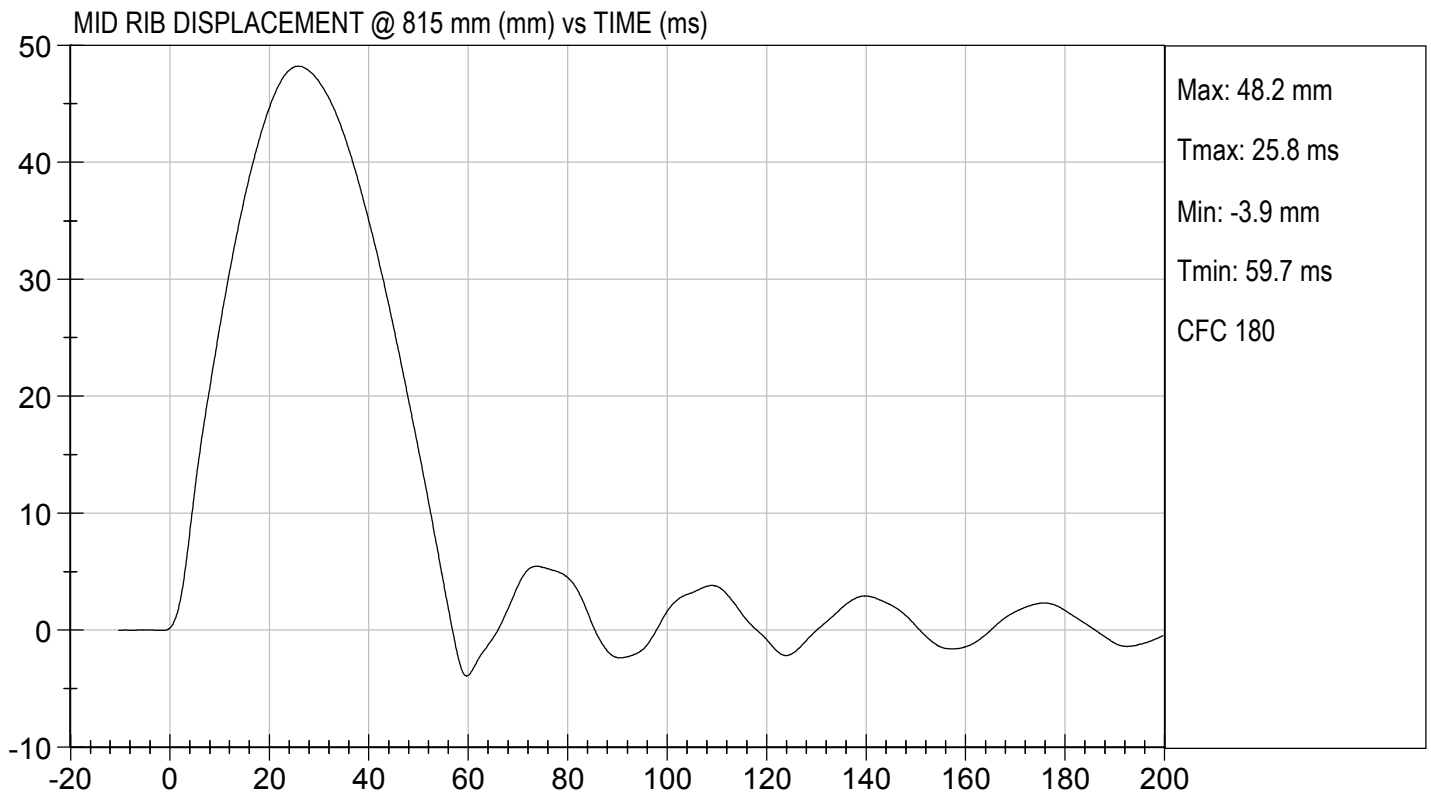
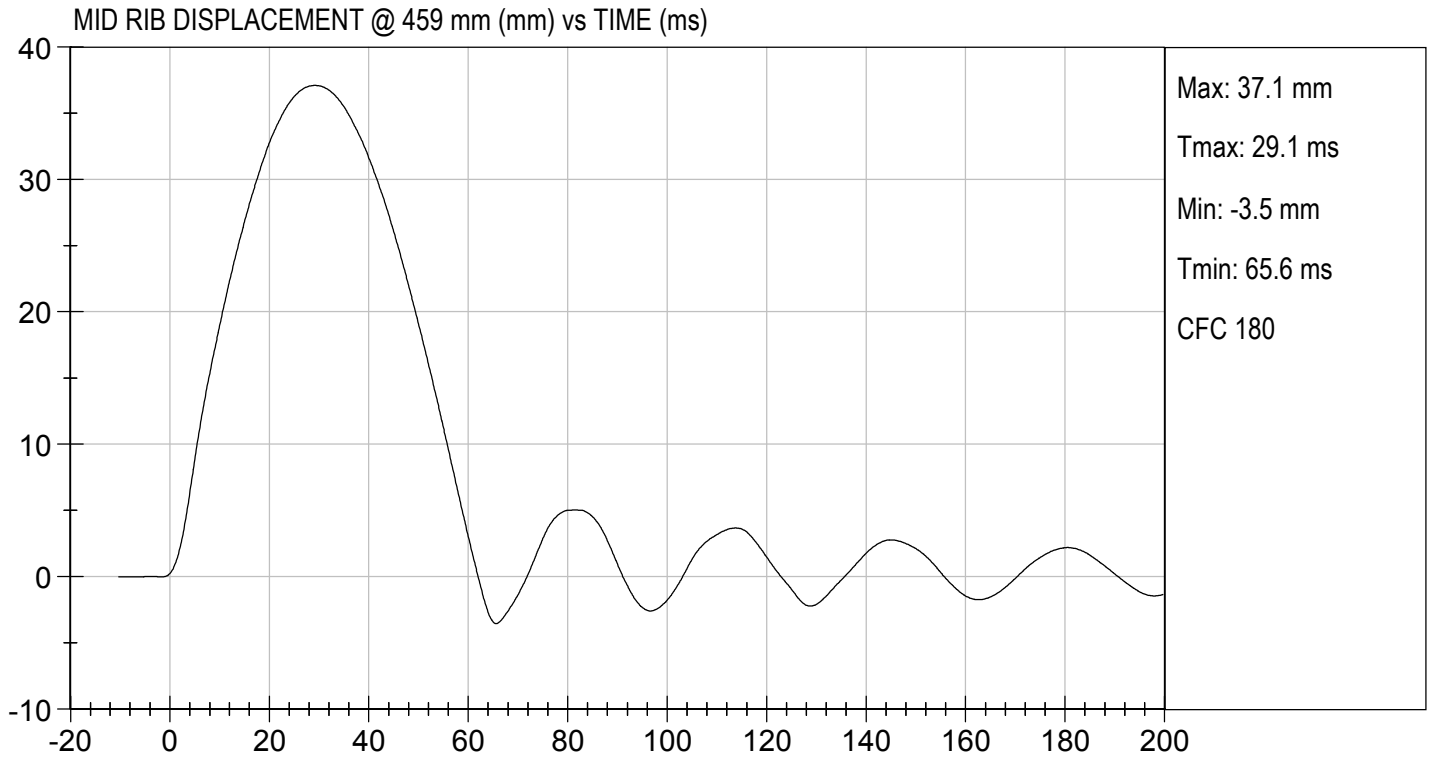
Test I.D: D173075

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.3 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 42 | Pass |
| Displacement at 459 mm | mm | 36.0 to 40.0 | 37.1 | Pass |
| Displacement at 815 mm | mm | 46.0 to 51.0 | 48.2 | Pass |
| Overall Test Results | | | | Pass |


Laboratory Technician

10/23/2017
Test Date


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MGA RESEARCH CORPORATION

LOWER RIB TEST

ES-2re DUMMY

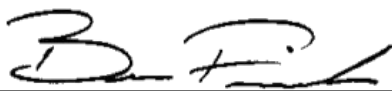
ATD Serial No: 032

Test I.D: D173076

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.3 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 42 | Pass |
| Displacement at 459 mm | mm | 36.0 to 40.0 | 38.2 | Pass |
| Displacement at 815 mm | mm | 46.0 to 51.0 | 50.0 | Pass |
| Overall Test Results | | | | Pass |

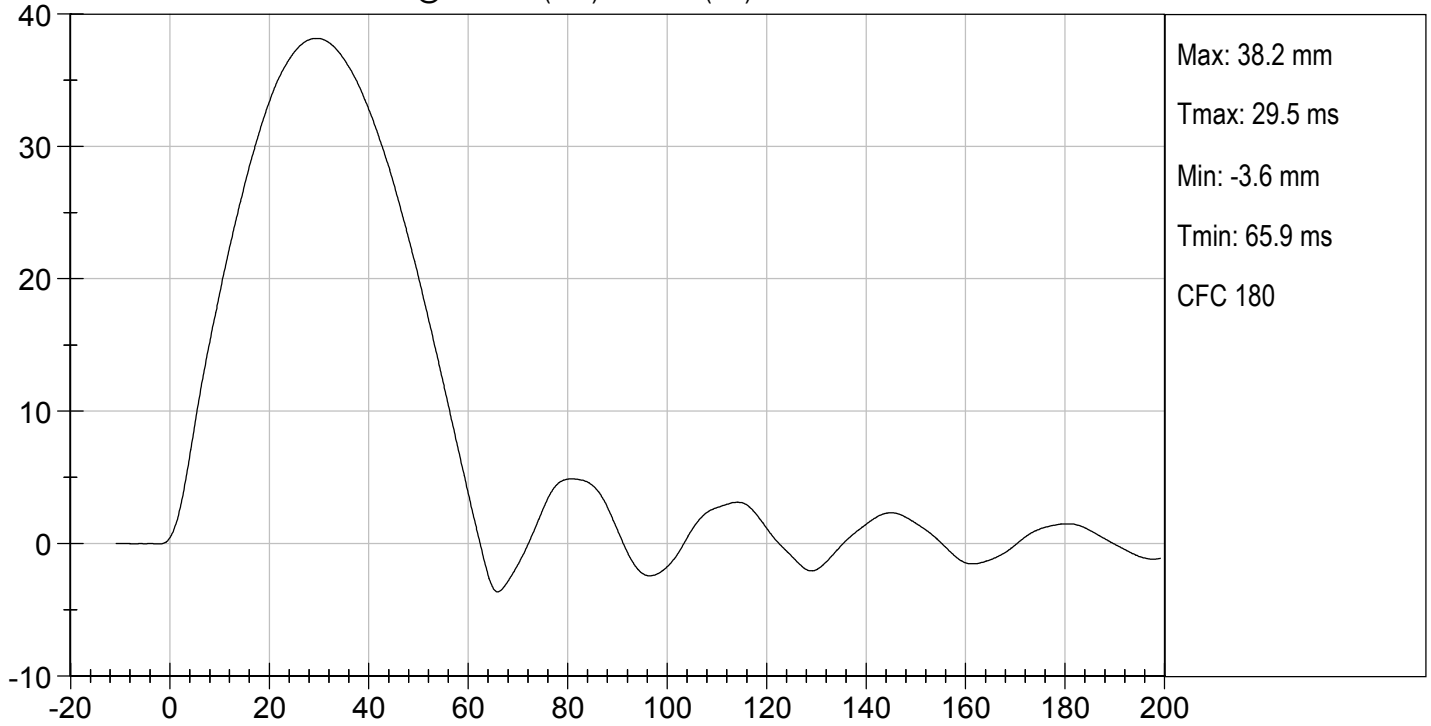

Laboratory Technician

10/23/2017
Test Date

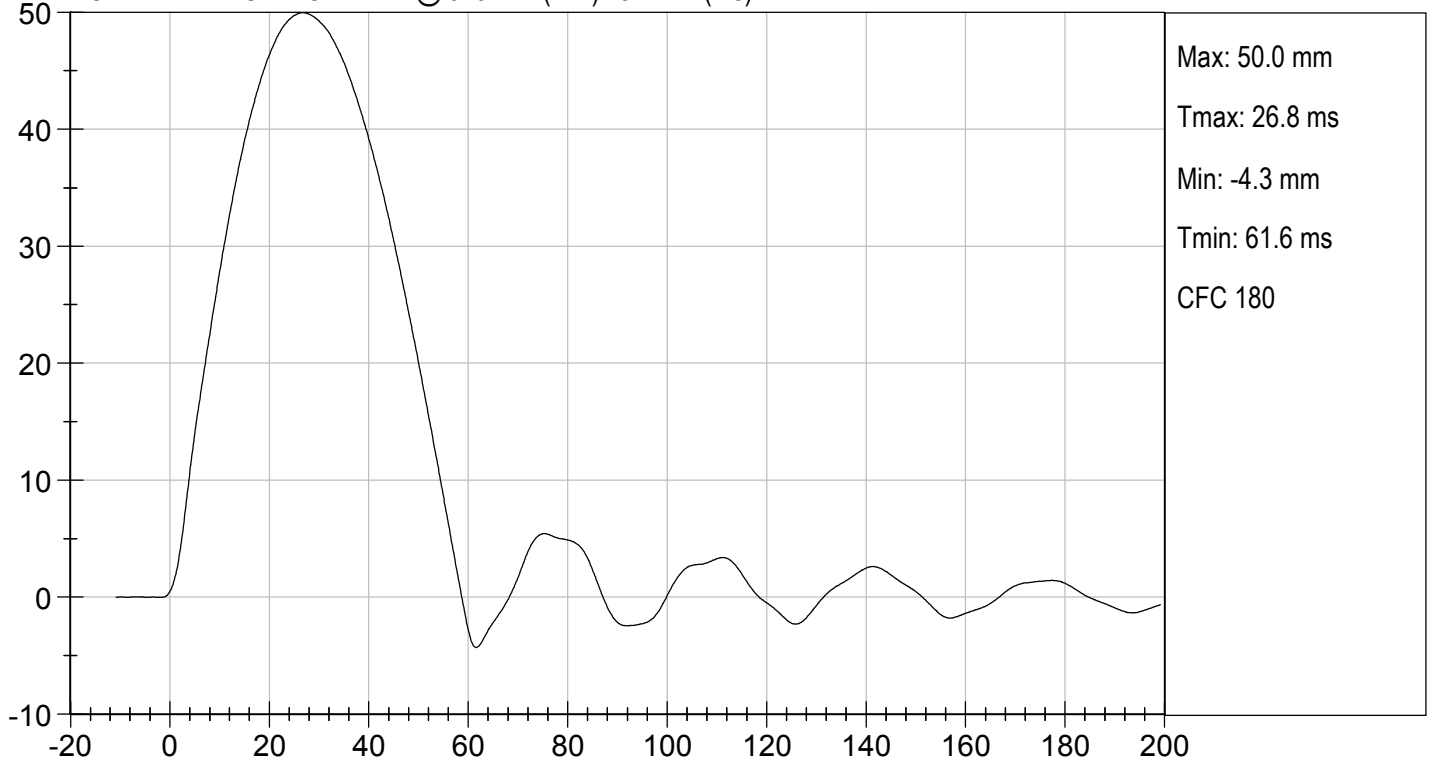

Approved By



LOWER RIB DISPLACEMENT @ 459 mm (mm) vs TIME (ms)



LOWER RIB DISPLACEMENT @ 815 mm (mm) vs TIME (ms)



MGA RESEARCH CORPORATION

ABDOMEN TEST

ES-2re DUMMY

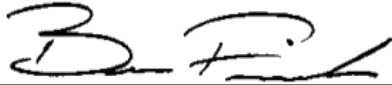
ATD Serial No: 032

Test I.D: D173077

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.3 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 42 | Pass |
| Probe Speed | m/s | 3.90 to 4.10 | 4.10 | Pass |
| Maximum Impactor Force | N | 4000 to 4800 | 4582 | Pass |
| Time of Maximum Impactor Force | ms | 10.6 to 13.0 | 11.8 | Pass |
| Maximum Total Abdomen Force | N | 2200 to 2700 | 2418 | Pass |
| Time of Maximum Abdomen Force | ms | 10.0 to 12.3 | 11.6 | Pass |
| Overall Test Results | | | | Pass |


Laboratory Technician

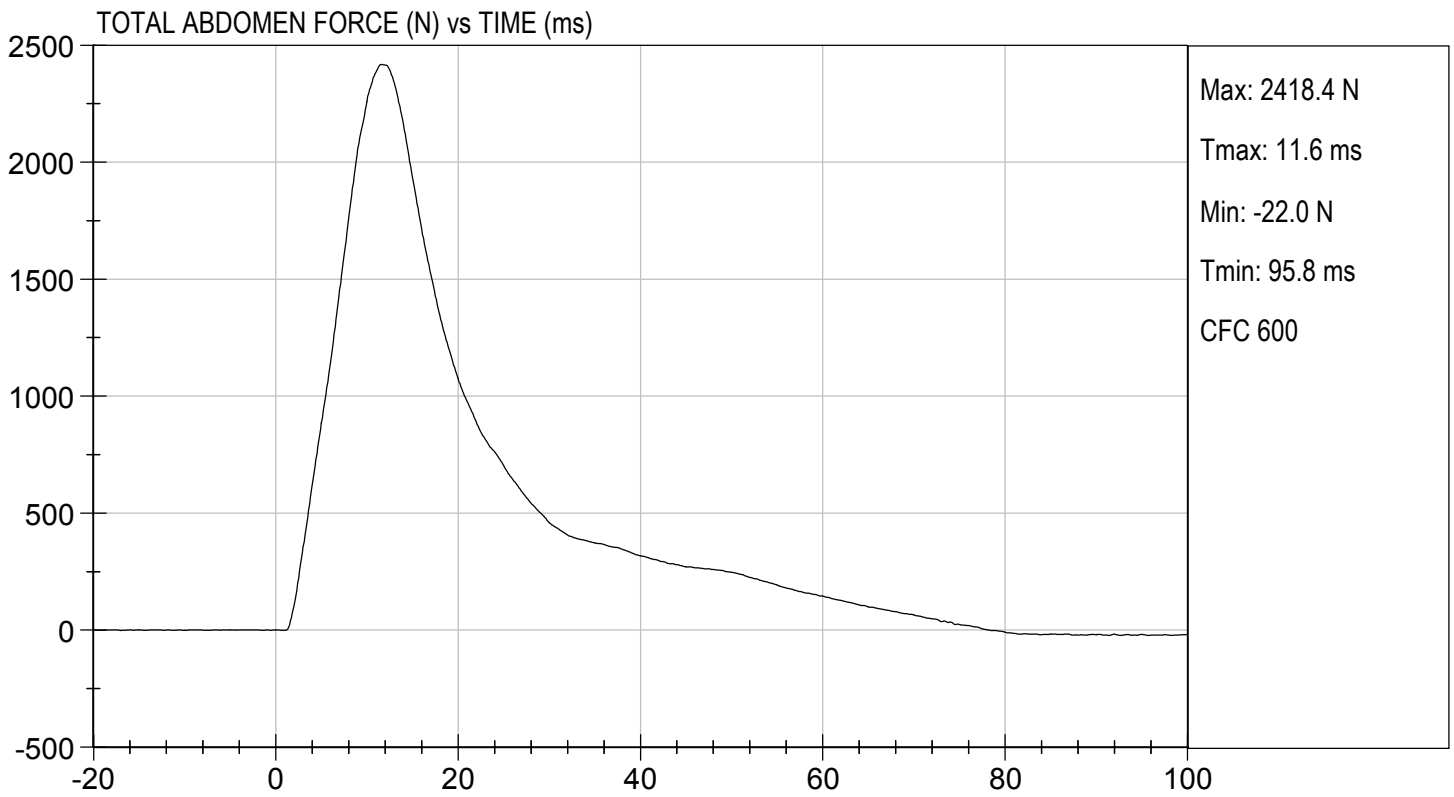
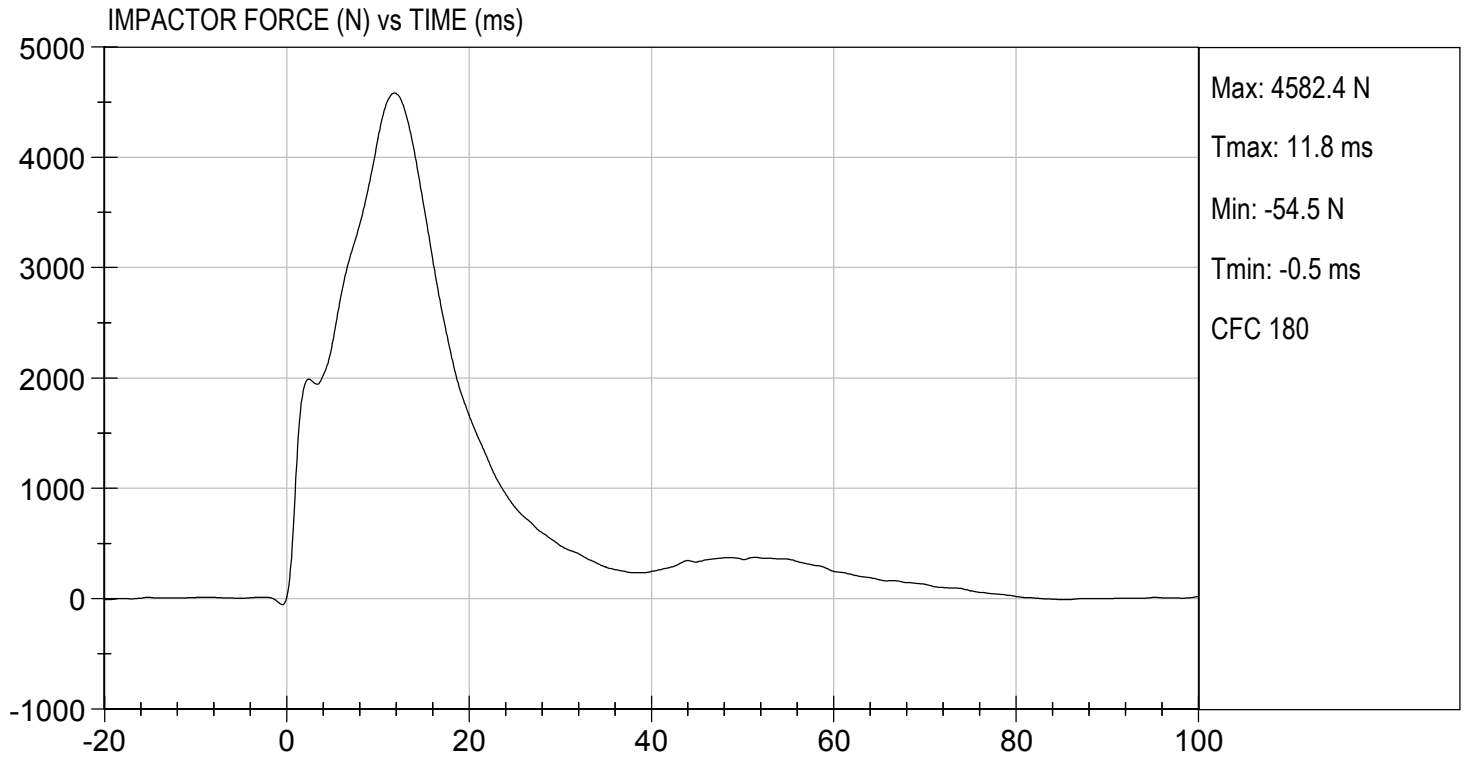
10/24/2017
Test Date

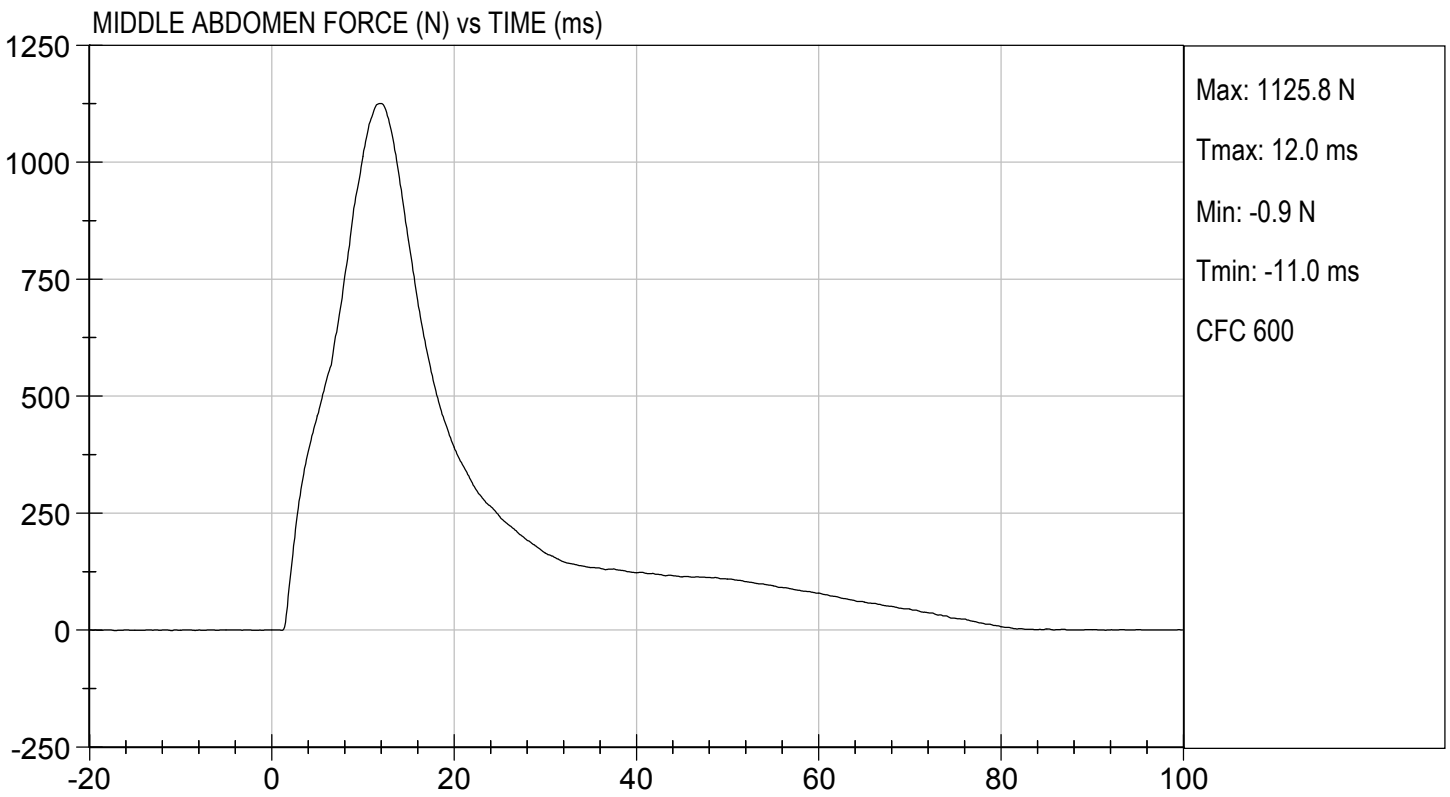
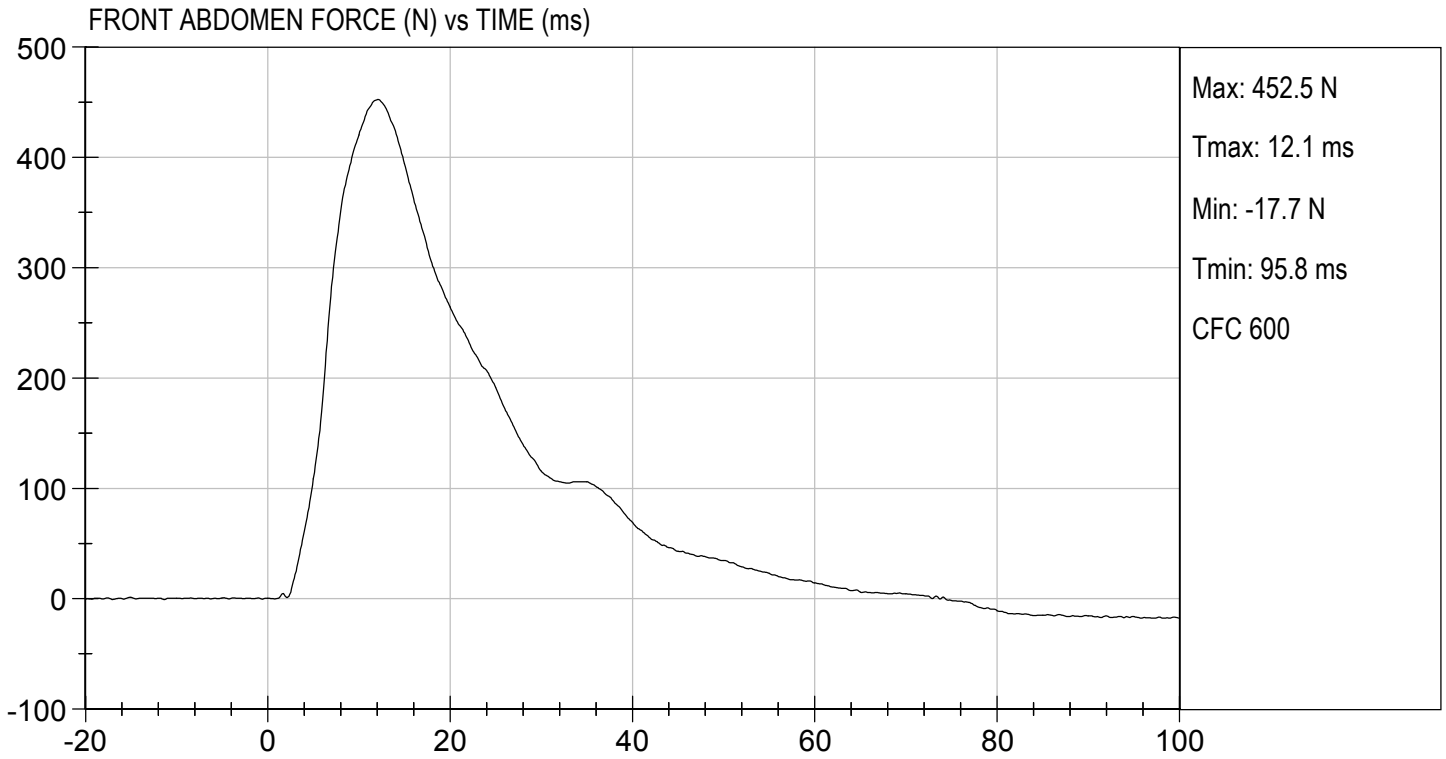

Approved By



TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 10/24/2017
TEST #: D173077

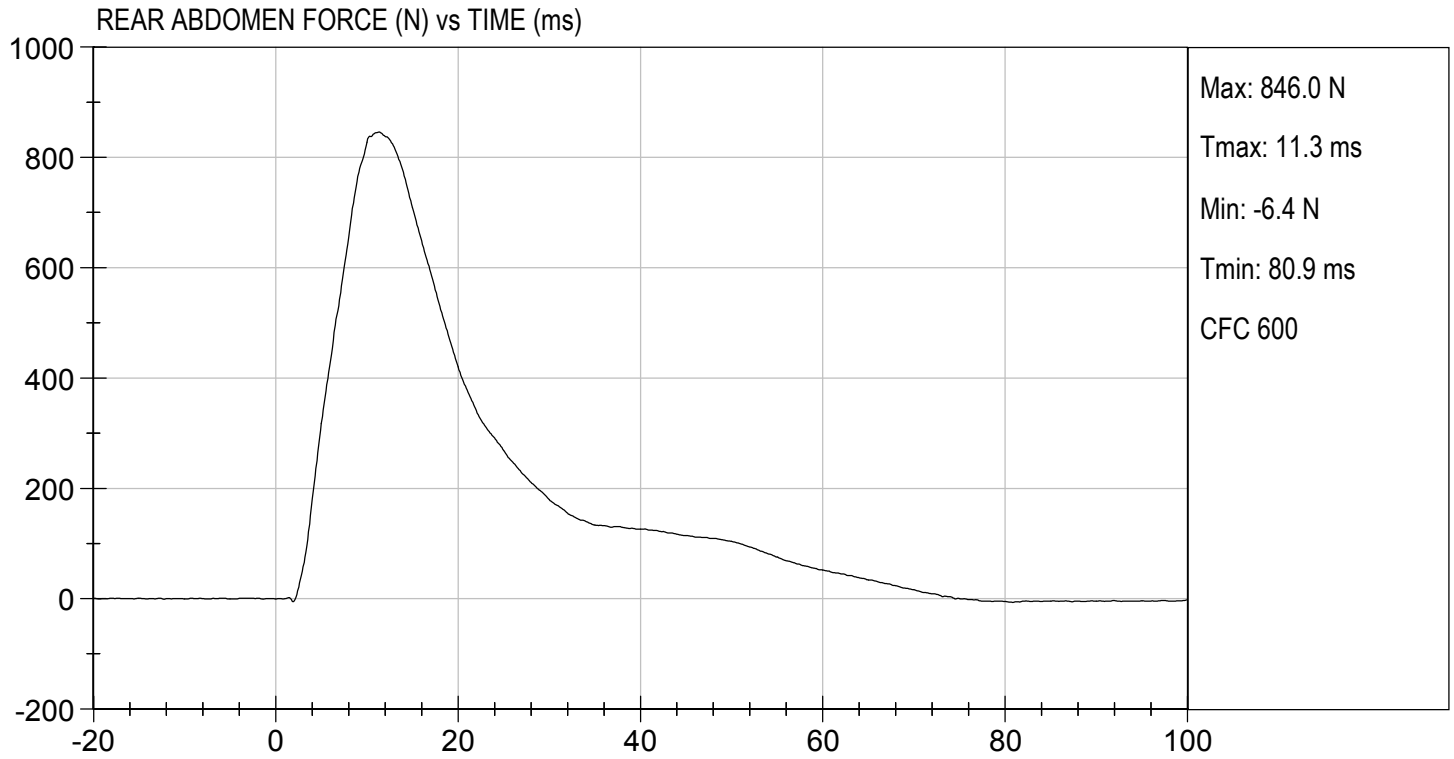






TEST DESC: ABDOMEN IMPACT
VELOCITY: 13.44 ft/s, 4.10 m/s

TEST DATE: 10/24/2017
TEST #: D173077



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
ES-2re DUMMY

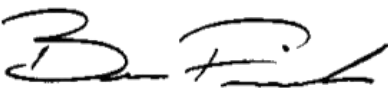
ATD Serial No: 032

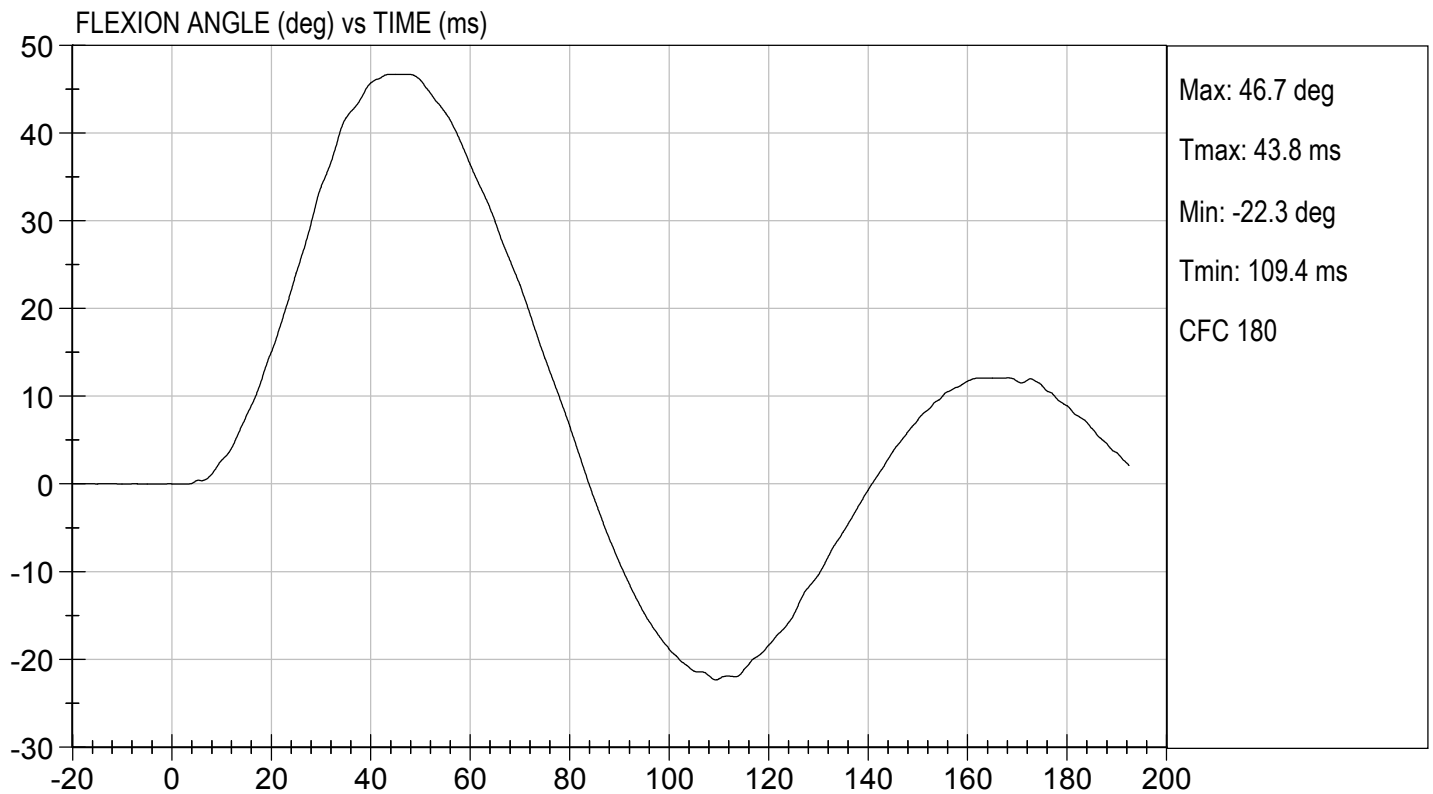
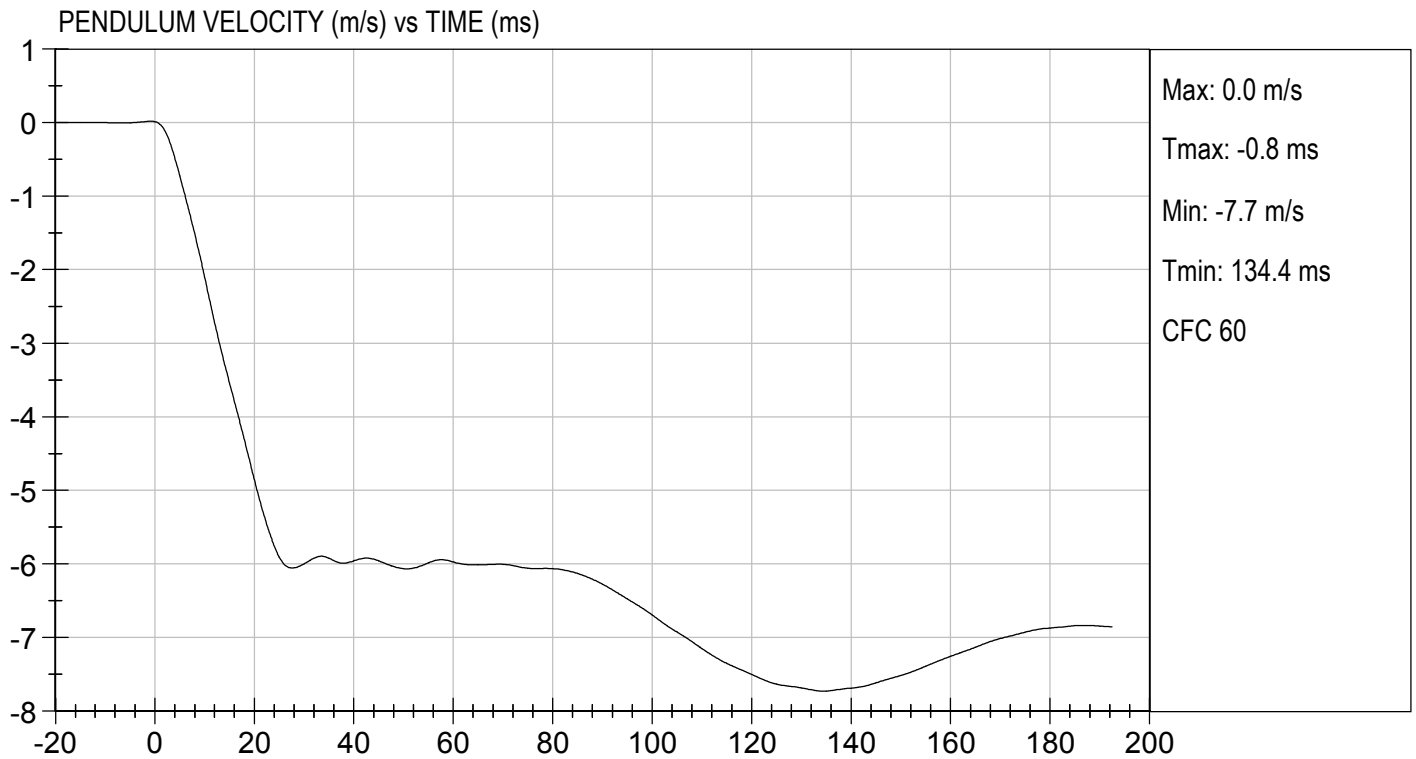
Test I.D.: D173078

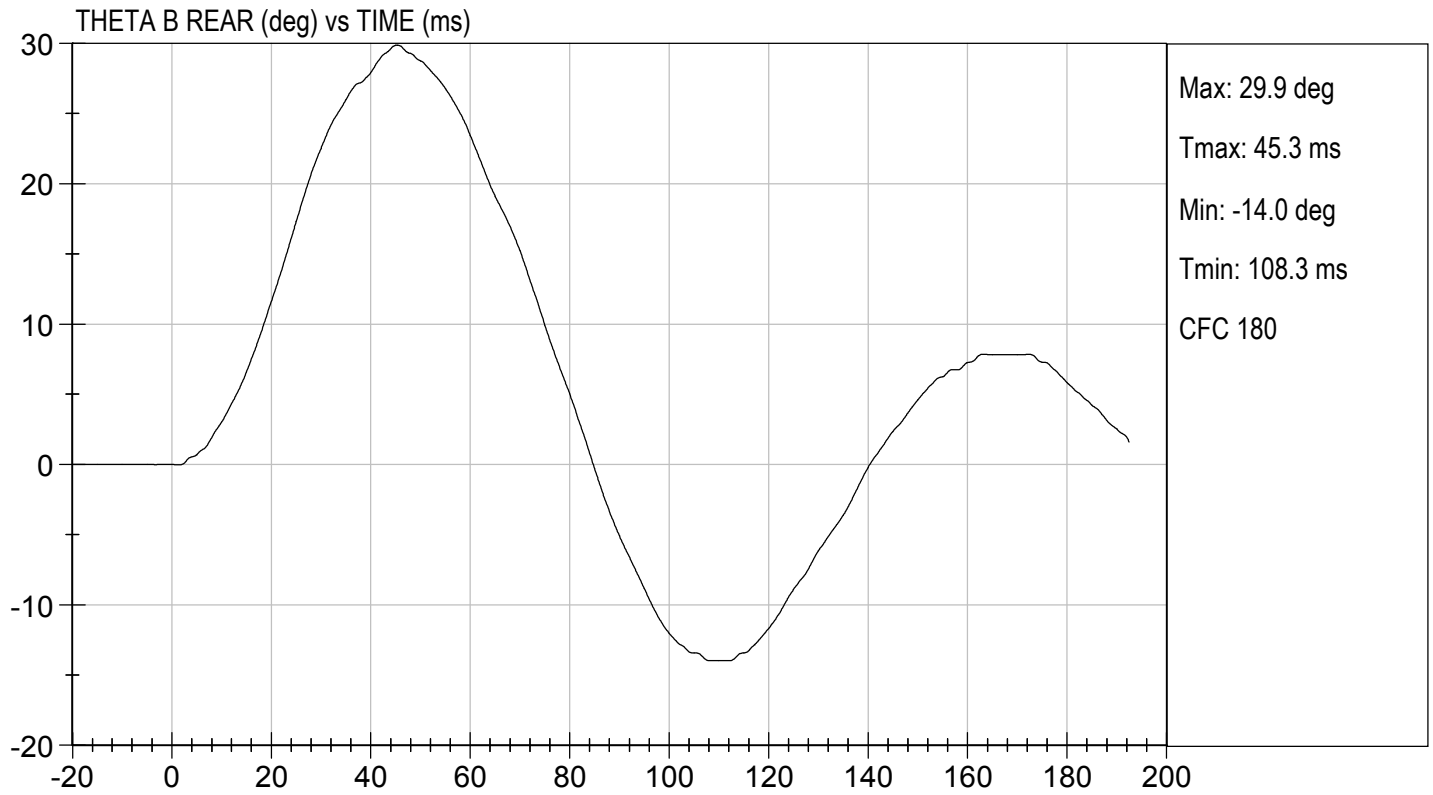
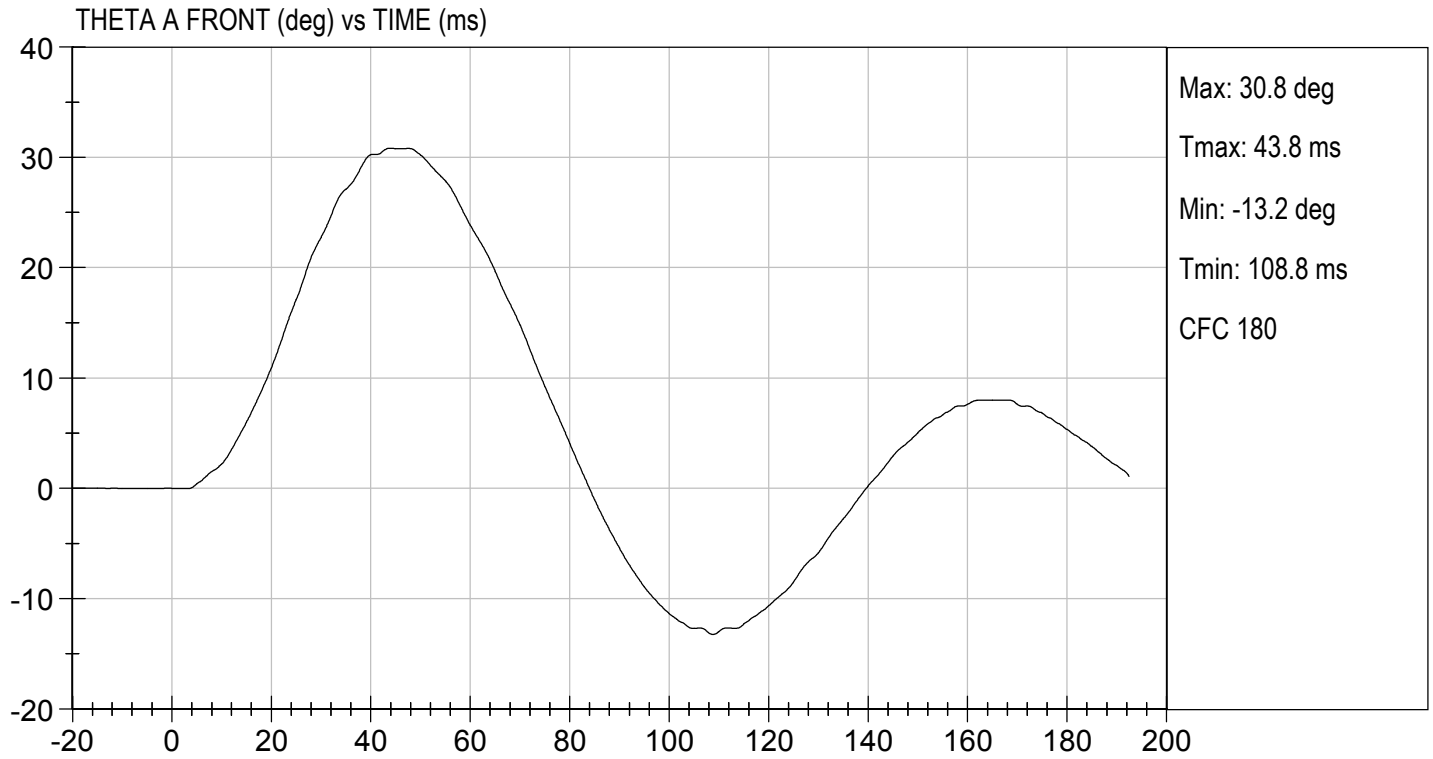
| Tested Parameter | | Units | Specification | Result | Pass/Fail |
|---|--------|-------|-----------------|--------|-------------|
| Laboratory Temperature | | deg C | 20.6 to 22.2 | 21.7 | Pass |
| Laboratory Relative Humidity | | % | 10 to 70 | 42 | Pass |
| Pendulum Speed | | m/s | 5.95 to 6.15 | 6.12 | Pass |
| Pendulum Velocity | 1 ms | m/s | -0.05 to 0.00 | -0.02 | Pass |
| | 3.7 ms | m/s | -0.425 to -0.24 | -0.411 | Pass |
| | 27 ms | m/s | -6.50 to -5.80 | -6.05 | Pass |
| | 30 ms | m/s | >= -6.50 | -6.00 | Pass |
| Maximum Flexion Angle | | deg | 45.0 to 55.0 | 46.7 | Pass |
| Time of Maximum Flexion Angle | | ms | 39.0 to 53.0 | 43.8 | Pass |
| Headform Rotation Decay to Initial Position | | ms | 37 to 57 | 45 | Pass |
| Overall Results | | | | | Pass |

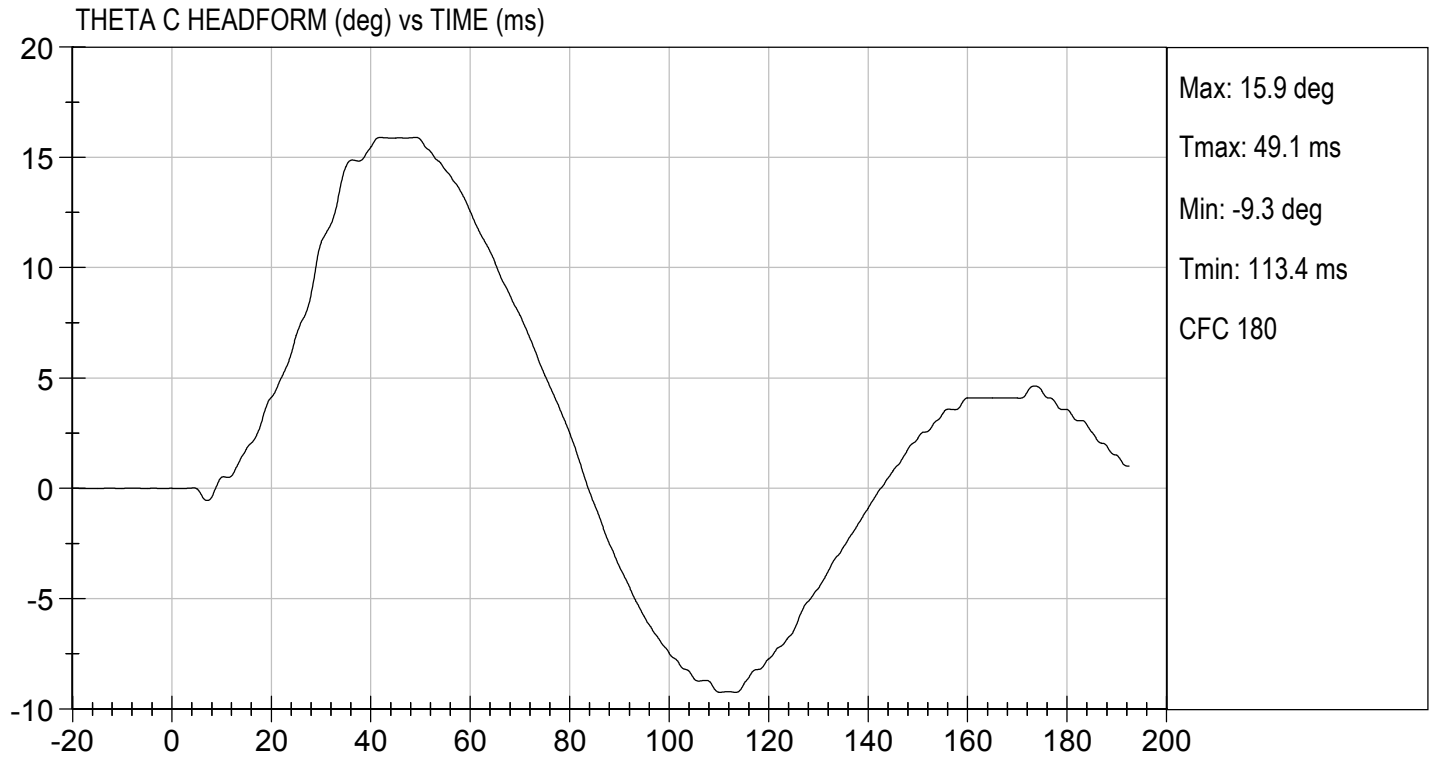

 Laboratory Technician

10/23/2017
 Test Date


 Approved By







MGA RESEARCH CORPORATION

**PELVIS TEST
ES-2re DUMMY**

ATD Serial No: 032

Test I.D: D173079

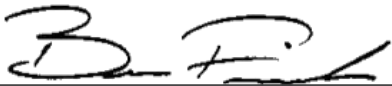
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.3 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 42 | Pass |
| Probe Speed | m/s | 4.20 to 4.40 | 4.27 | Pass |
| Maximum Impactor Force | N | 4700 to 5400 | 4851 | Pass |
| Time of Maximum Impactor Force | ms | 11.8 to 16.1 | 13.2 | Pass |
| Maximum Pubic Force | N | 1230 to 1590 | 1261 | Pass |
| Time of Maximum Pubic Force | ms | 12.2 to 17.0 | 13.8 | Pass |
| Overall Test Results | | | | Pass |



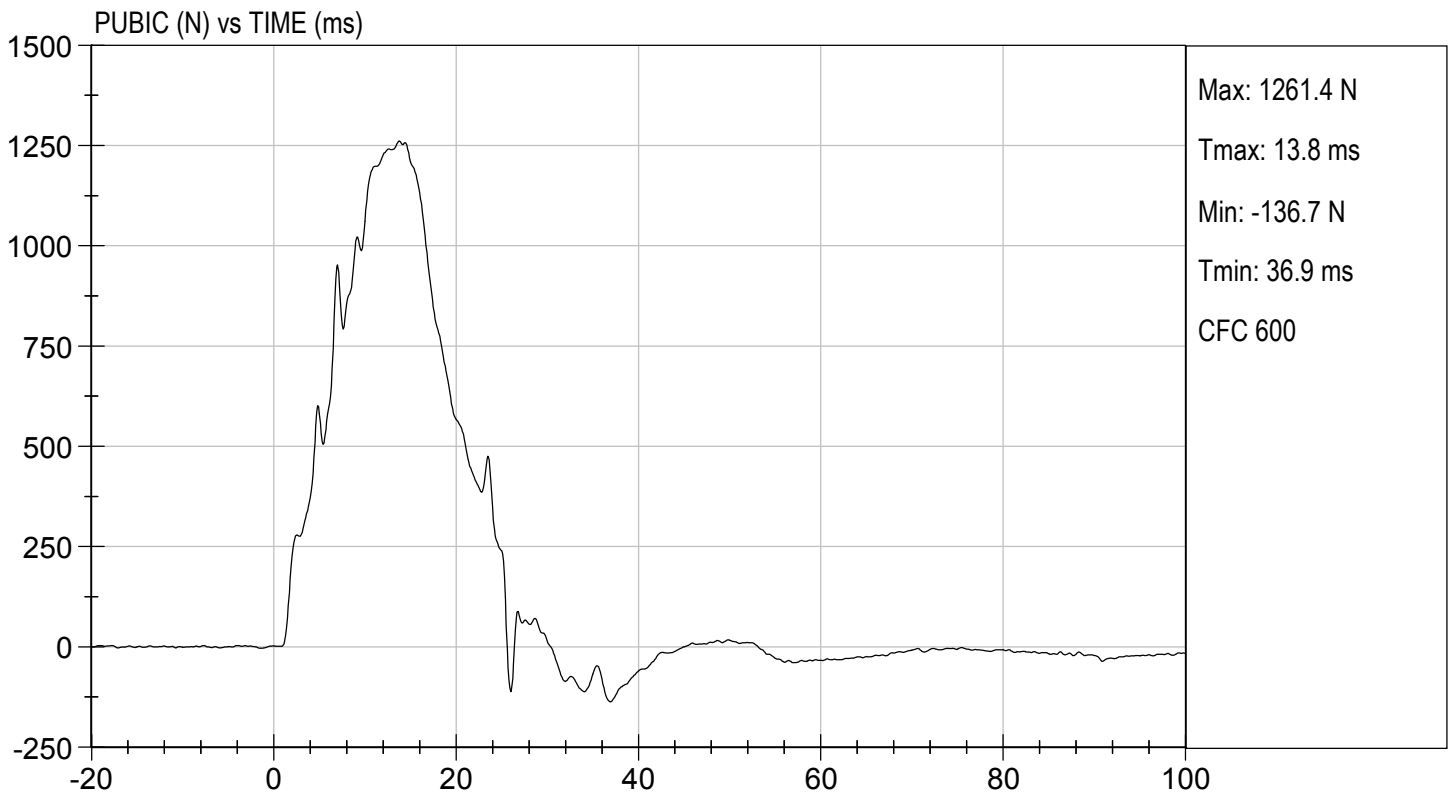
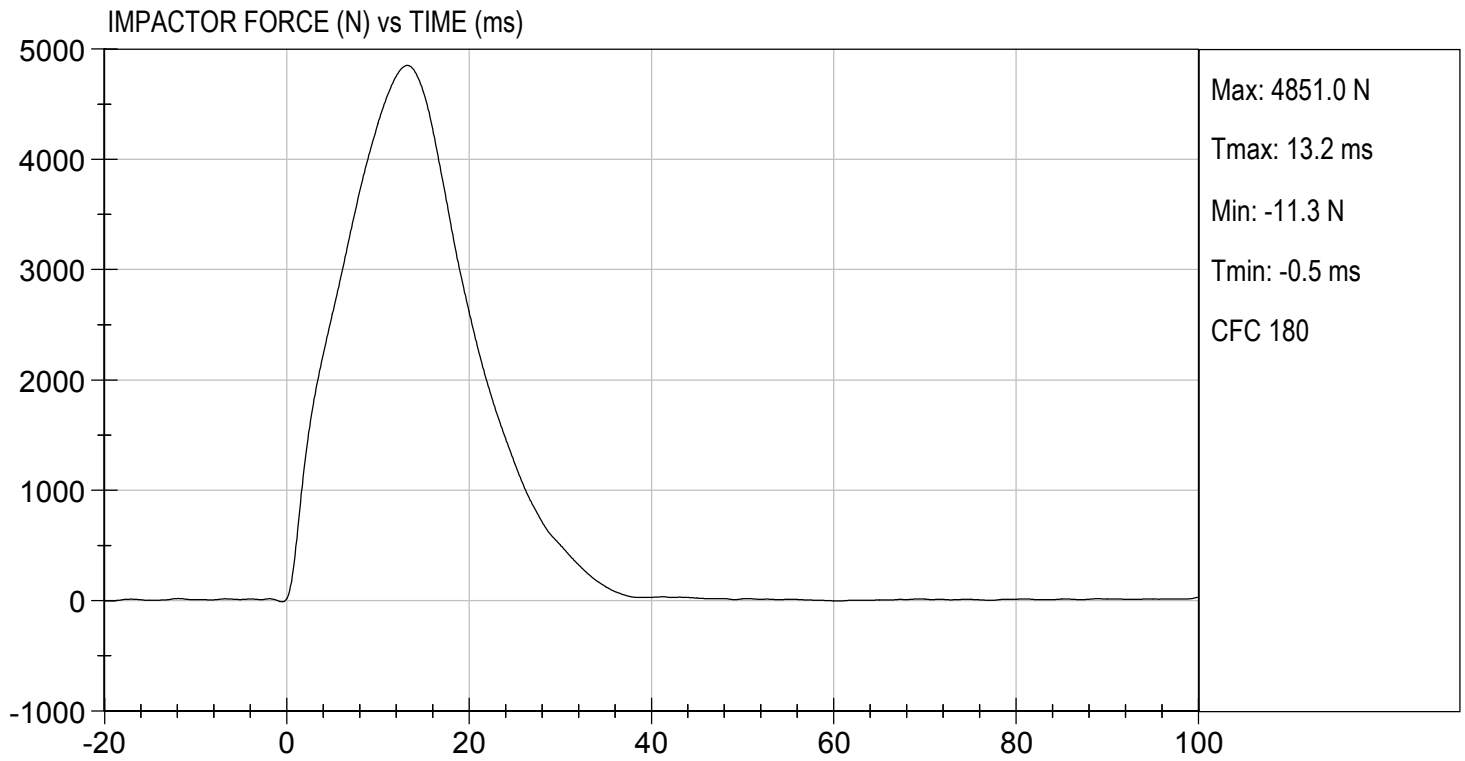
Laboratory Technician

10/24/2017

Test Date



Approved By



MGA RESEARCH CORPORATION
THORAX IMPACT TEST
ES-2re DUMMY

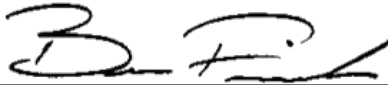
ATD Serial No: 032

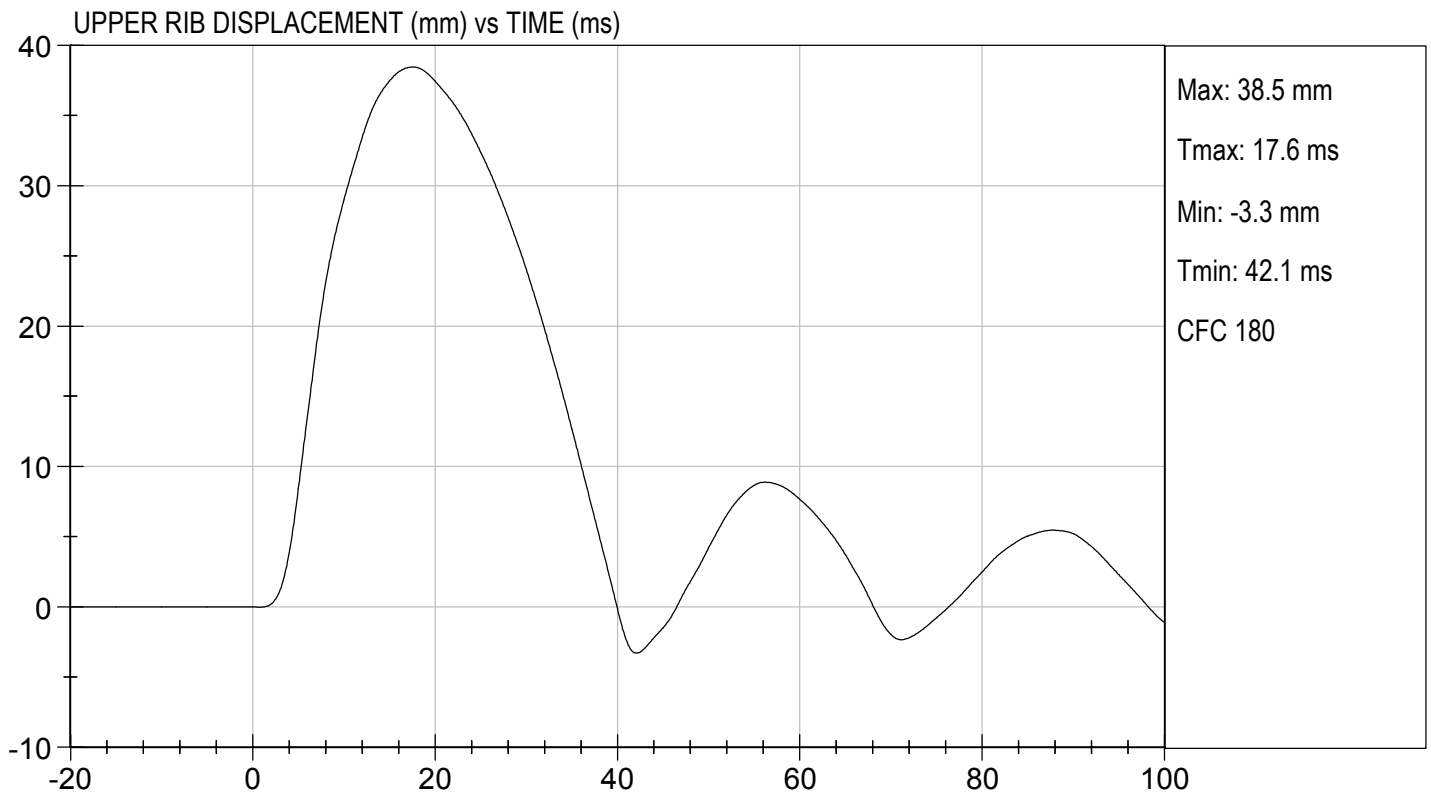
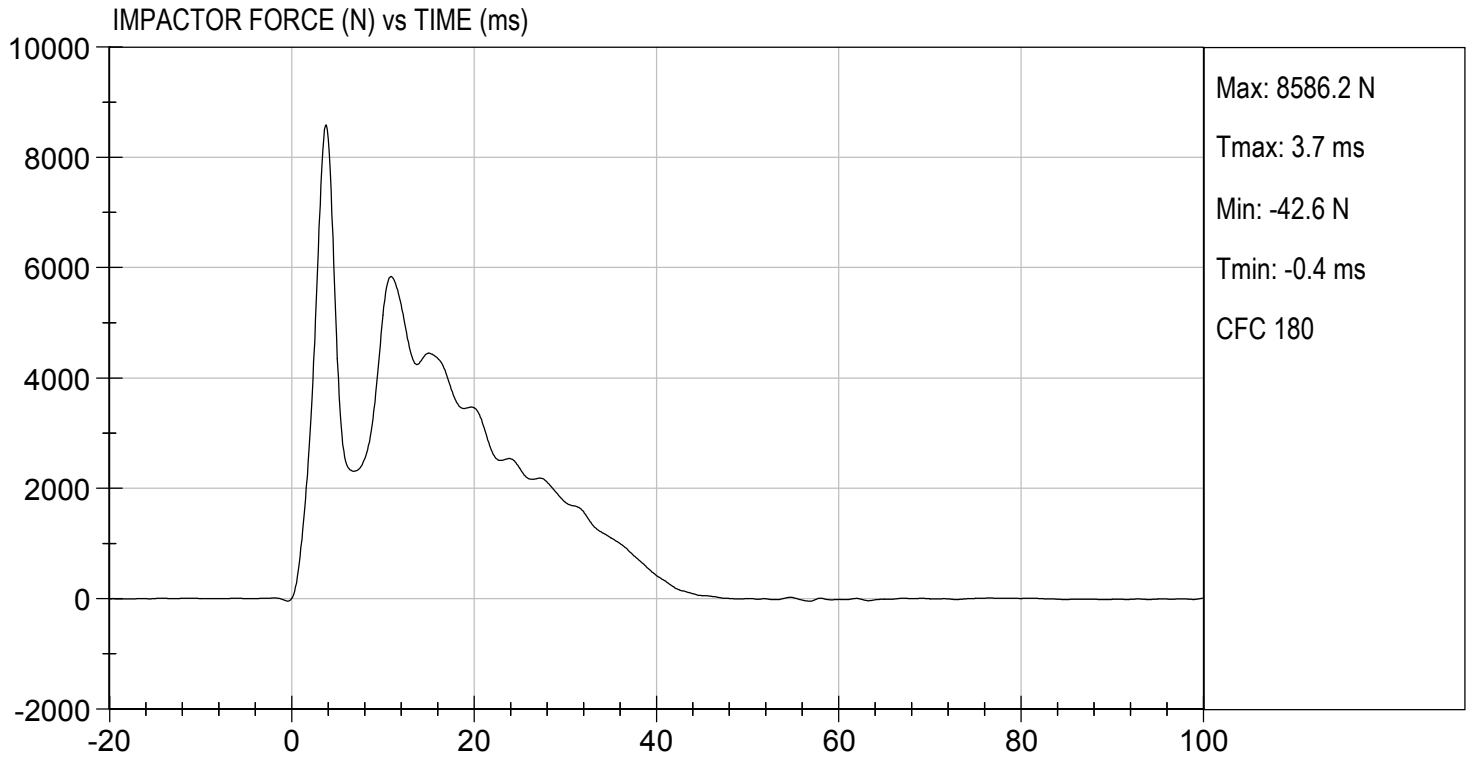
Test I.D: D173070

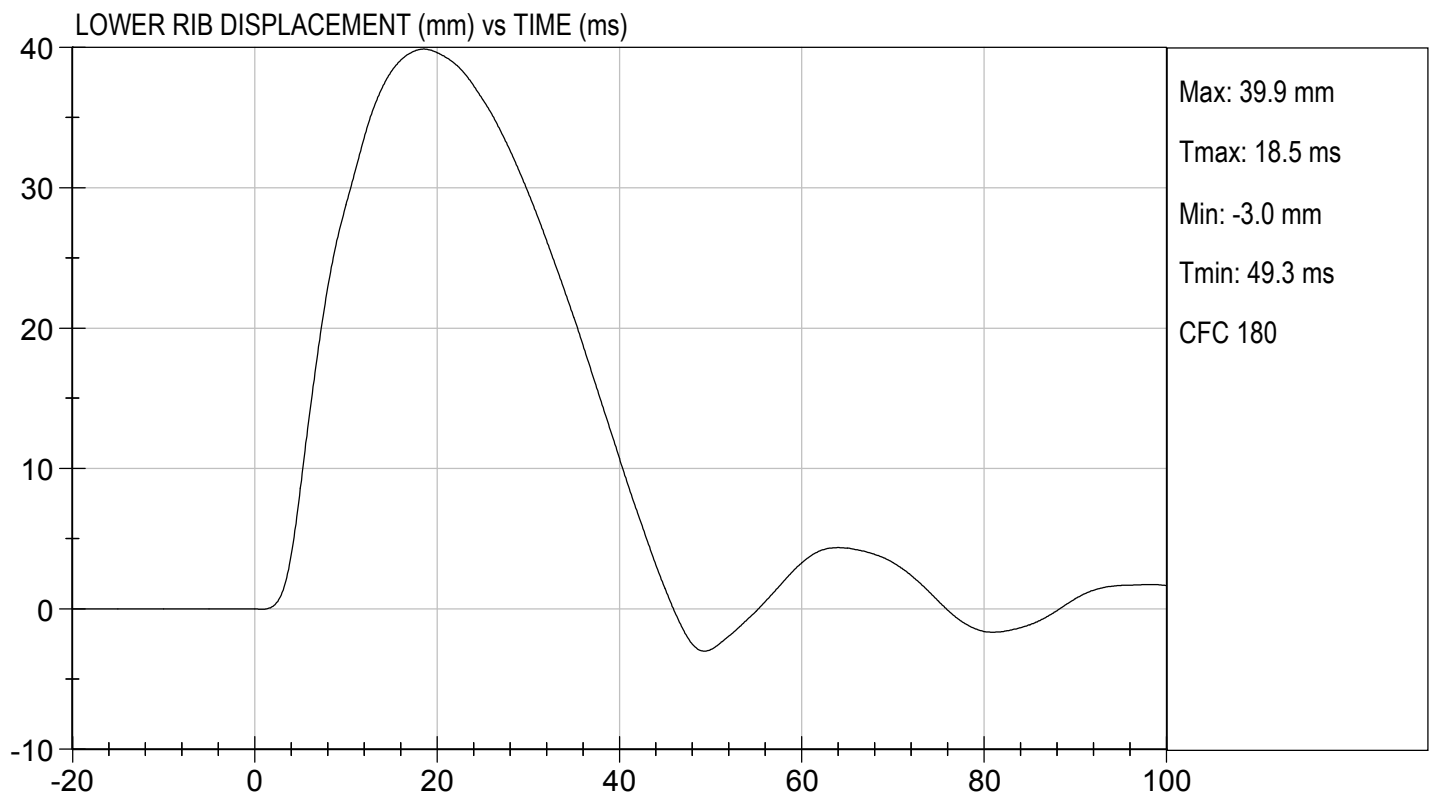
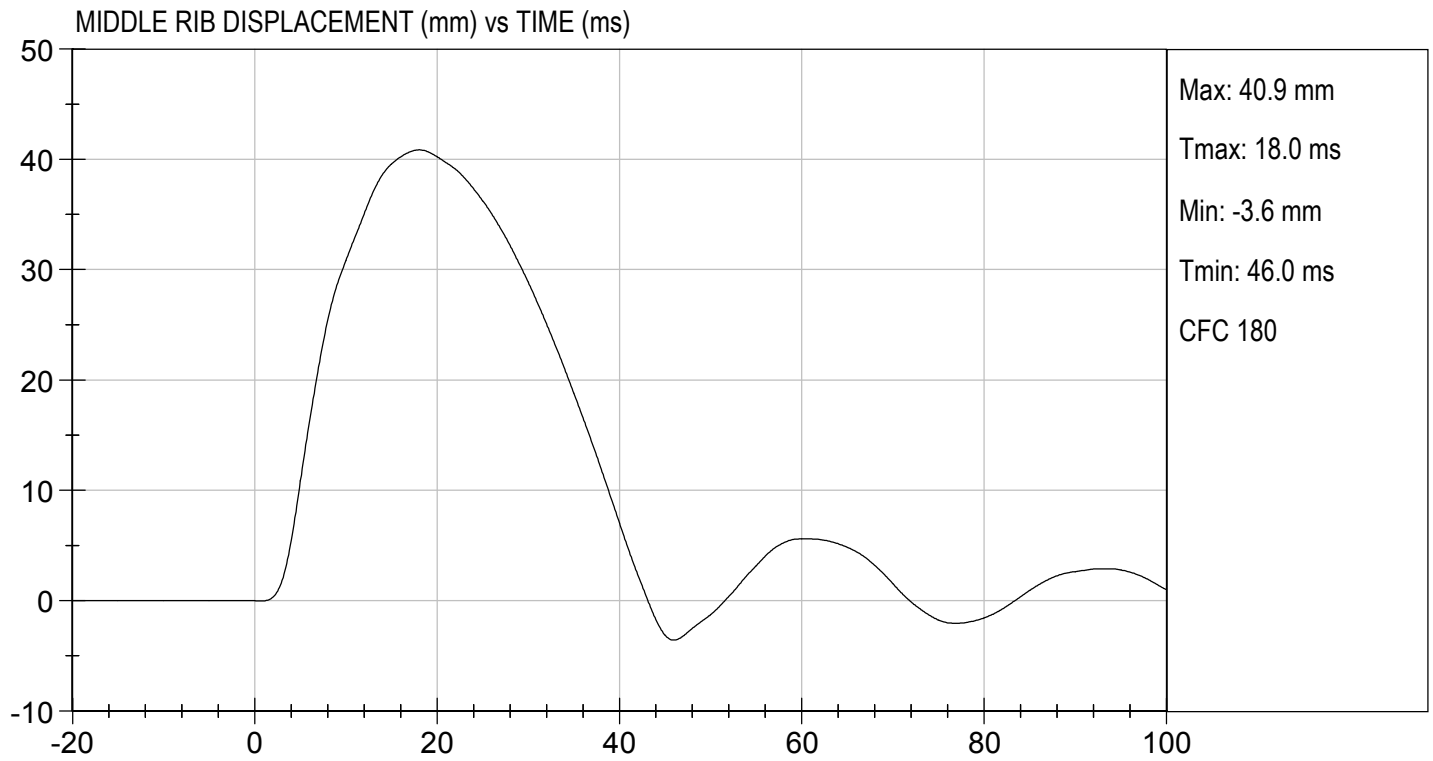
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|-------------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.3 | Pass |
| Humidity | % | 10 to 70 | 42 | Pass |
| Probe Speed | m/s | 5.40 to 5.60 | 5.58 | Pass |
| Maximum Impactor Force (after 6 ms) | N | 5100 to 6200 | 5840 | Pass |
| Upper Rib Displacement | mm | 34.0 to 41.0 | 38.5 | Pass |
| Middle Rib Displacement | mm | 37.0 to 45.0 | 40.9 | Pass |
| Lower Rib Displacement | mm | 37.0 to 44.0 | 39.9 | Pass |
| Overall Test Results | | | | Pass |


 Laboratory Technician

10/24/2017
 Test Date


 Approved By





SID-IIsD External Measurements
SN: 296

| No. | Name | Spec. (mm) | Result | Pass/Fail |
|------------|-------------------------------|-------------------|---------------|------------------|
| A | Sitting Height | 772 - 788 | 784 | Pass |
| B | Shoulder Pivot Height | 437 - 453 | 442 | Pass |
| C | H-point Height | 79 - 89 | 83 | Pass |
| D | H-point from Seatback | 141 - 151 | 145 | Pass |
| E | Shoulder Pivot from Backline | 97 - 107 | 99 | Pass |
| F | Thigh Clearance | 119 - 135 | 121 | Pass |
| G | Head Breadth | 140 - 148 | 142 | Pass |
| H | Head Back from Backline | 40 - 46 | 45 | Pass |
| I | Head Depth | 178 - 188 | 180 | Pass |
| J | Head Circumference | 541 - 551 | 548 | Pass |
| K | Buttock to Knee Length | 514 - 540 | 535 | Pass |
| L | Popliteal Height | 343 - 369 | 358 | Pass |
| M | Knee Pivot to Floor Height | 392 - 409 | 404 | Pass |
| N | Buttock Popliteal Length | 416 - 442 | 435 | Pass |
| O | Chest Depth w/o Jacket | 195 - 211 | 206 | Pass |
| P | Foot Length | 216 - 232 | 219 | Pass |
| Q | Hip Breadth (w/ pelvic plugs) | 313 - 323 | 316 | Pass |
| R | Arm Length | 249 - 259 | 250 | Pass |
| S | Knee Joint to Seatback | 477 - 493 | 481 | Pass |
| V | Shoulder Width | 341 - 357 | 346 | Pass |
| W | Foot Width | 78 - 94 | 85 | Pass |
| Y | Chest Circumference w/ jacket | 851 - 881 | 870 | Pass |
| Z | Waist Circumference | 761 - 791 | 772 | Pass |

**MGA RESEARCH CORPORATION
HEAD DROP TEST
SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test ID: D172791

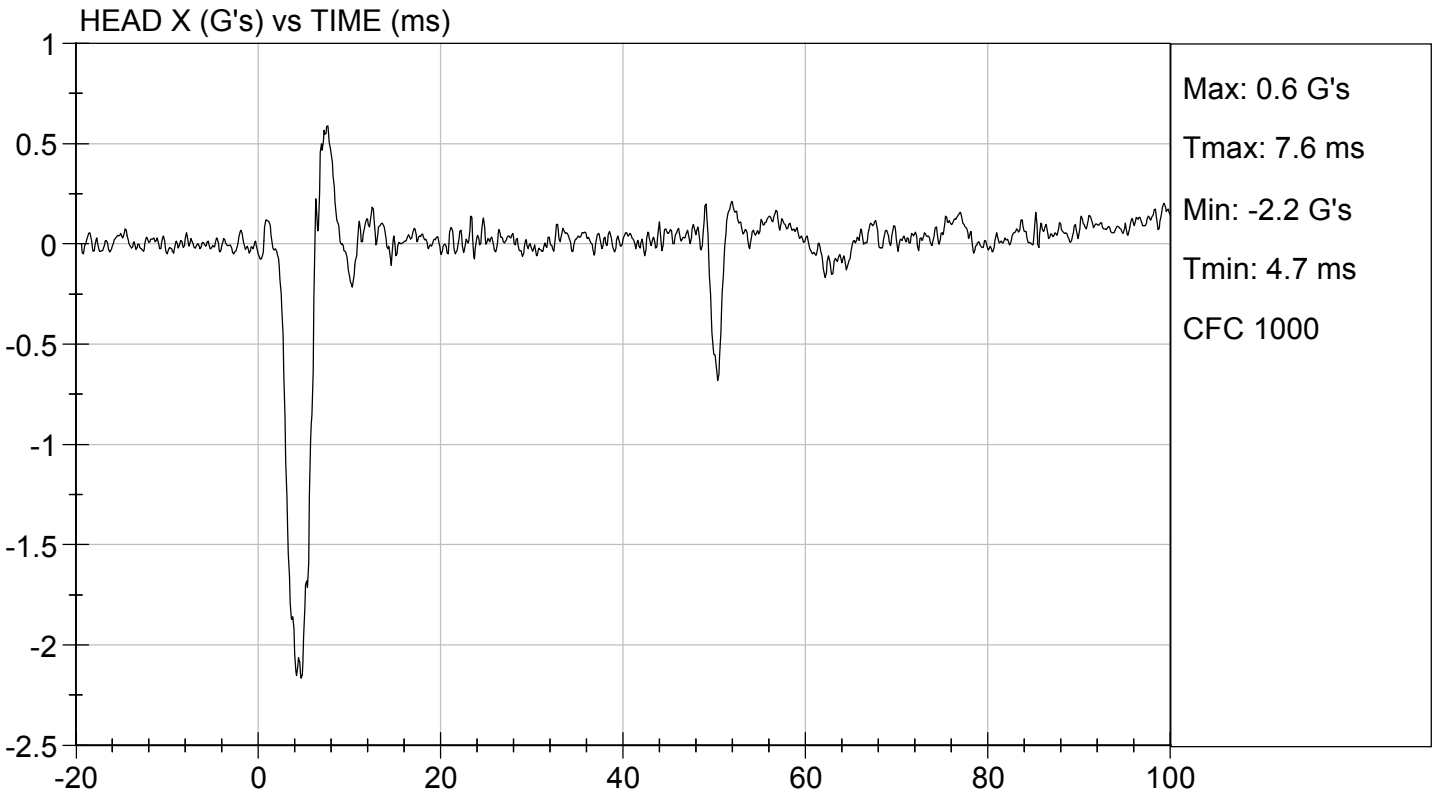
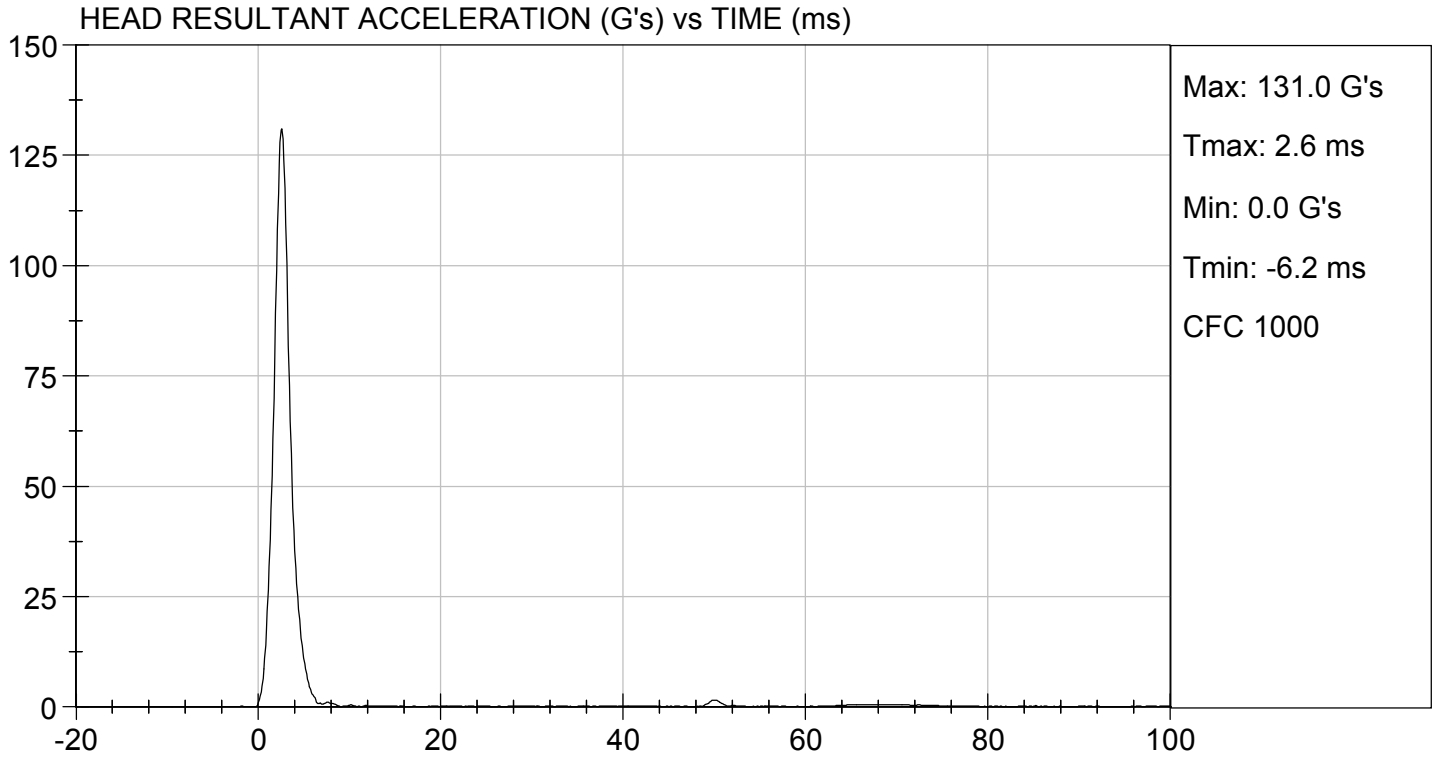
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.3 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 44 | Pass |
| Peak Resultant Acceleration | G's | 115 to 137 | 131 | Pass |
| Peak Longitudinal Acceleration | G's | +/- 15 | -2.2 | Pass |
| Unimodal | N/A | Yes | Yes | Pass |
| Oscillations | N/A | <15% | Yes | Pass |
| Overall Test Results | | | | Pass |

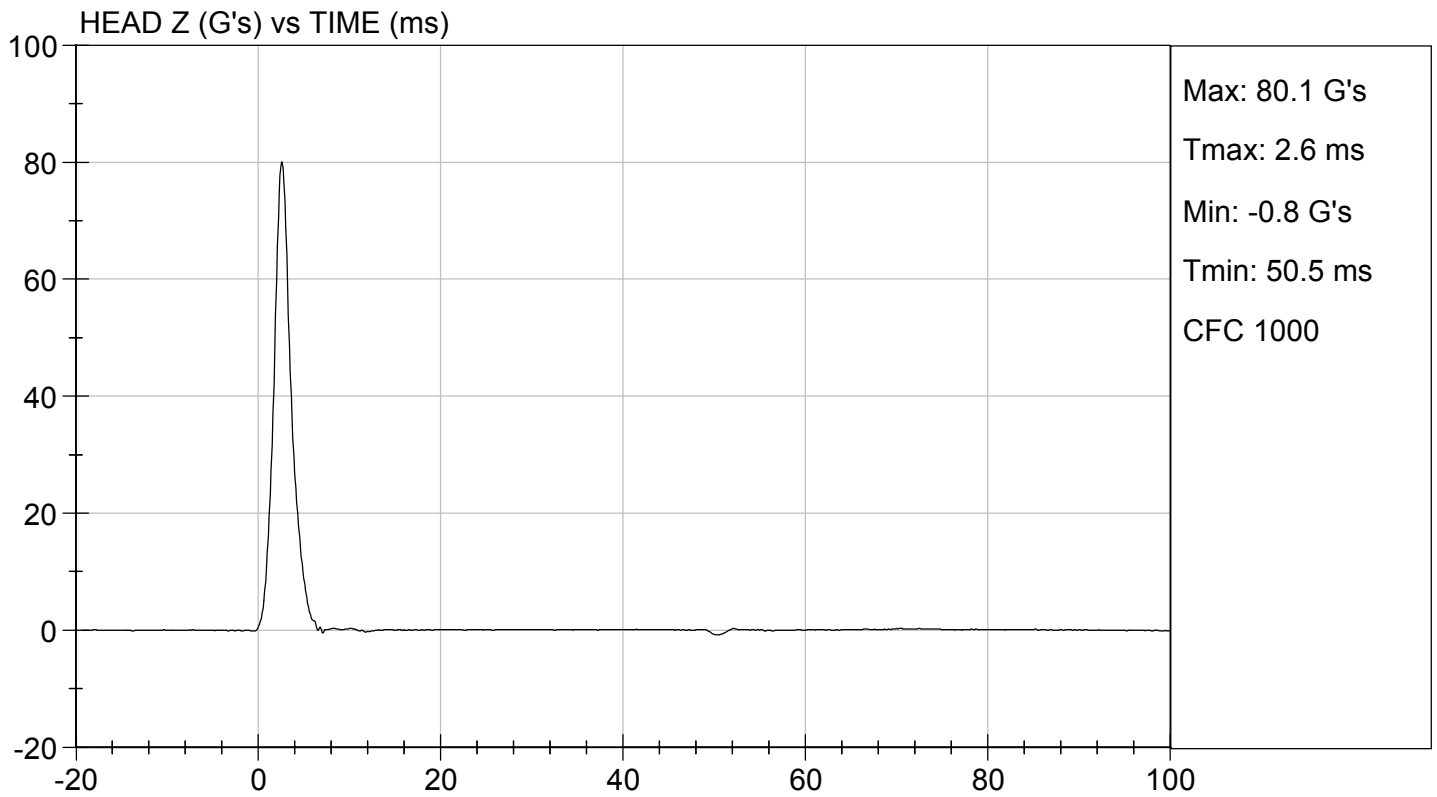
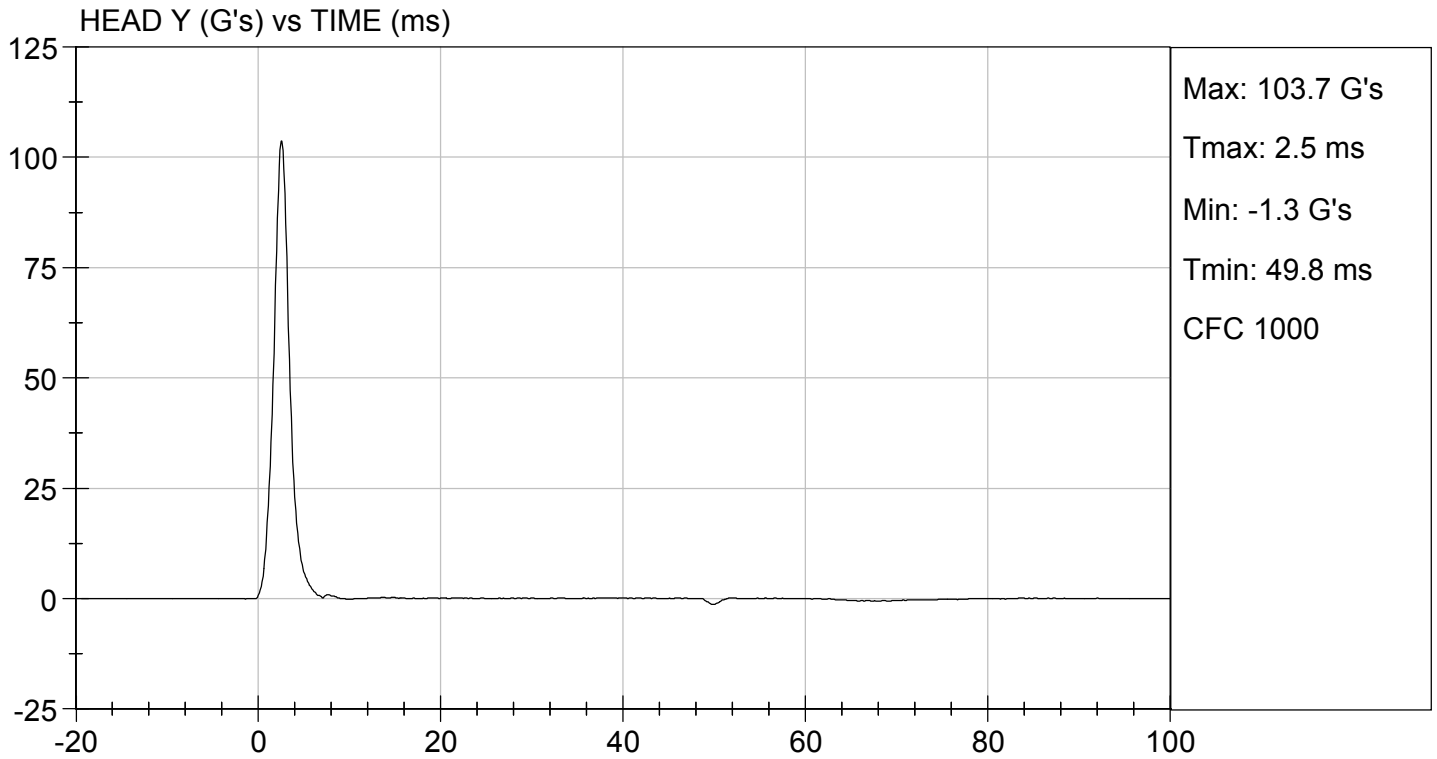
Danielle Redinlaugh
Laboratory Technician

10/03/2017

Test Date

B. F.
Approved By





**MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test I.D.: D172792

| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|----------------------------------|-----------|---------------|--------------|-------------|------|
| Temperature | deg C | 20.6 to 22.2 | 20.7 | Pass | |
| Humidity | % | 10 to 70 | 52 | Pass | |
| Impact Velocity | m/s | 5.51 to 5.63 | 5.58 | Pass | |
| Pendulum Velocity | 10 ms | m/s | 2.20 to 2.80 | 2.47 | Pass |
| | 15 ms | m/s | 3.30 to 4.10 | 3.67 | Pass |
| | 20 ms | m/s | 4.40 to 5.40 | 4.95 | Pass |
| | 25 ms | m/s | 5.40 to 6.10 | 5.68 | Pass |
| | 25-100 ms | m/s | 5.50 to 6.20 | 5.69 | Pass |
| Maximum D-Plane Rotation | deg | 71 to 81 | 74 | Pass | |
| Time of Maximum D-Plane Rotation | ms | 50 to 70 | 62 | Pass | |
| Maximum Occipital Condyle Moment | Nm | -44 to -36 | -43 | Pass | |
| Time of Moment Decay to 0 Nm | ms | 102 to 126 | 112 | Pass | |
| Overall Test Results | | | | Pass | |

Emily Fliess

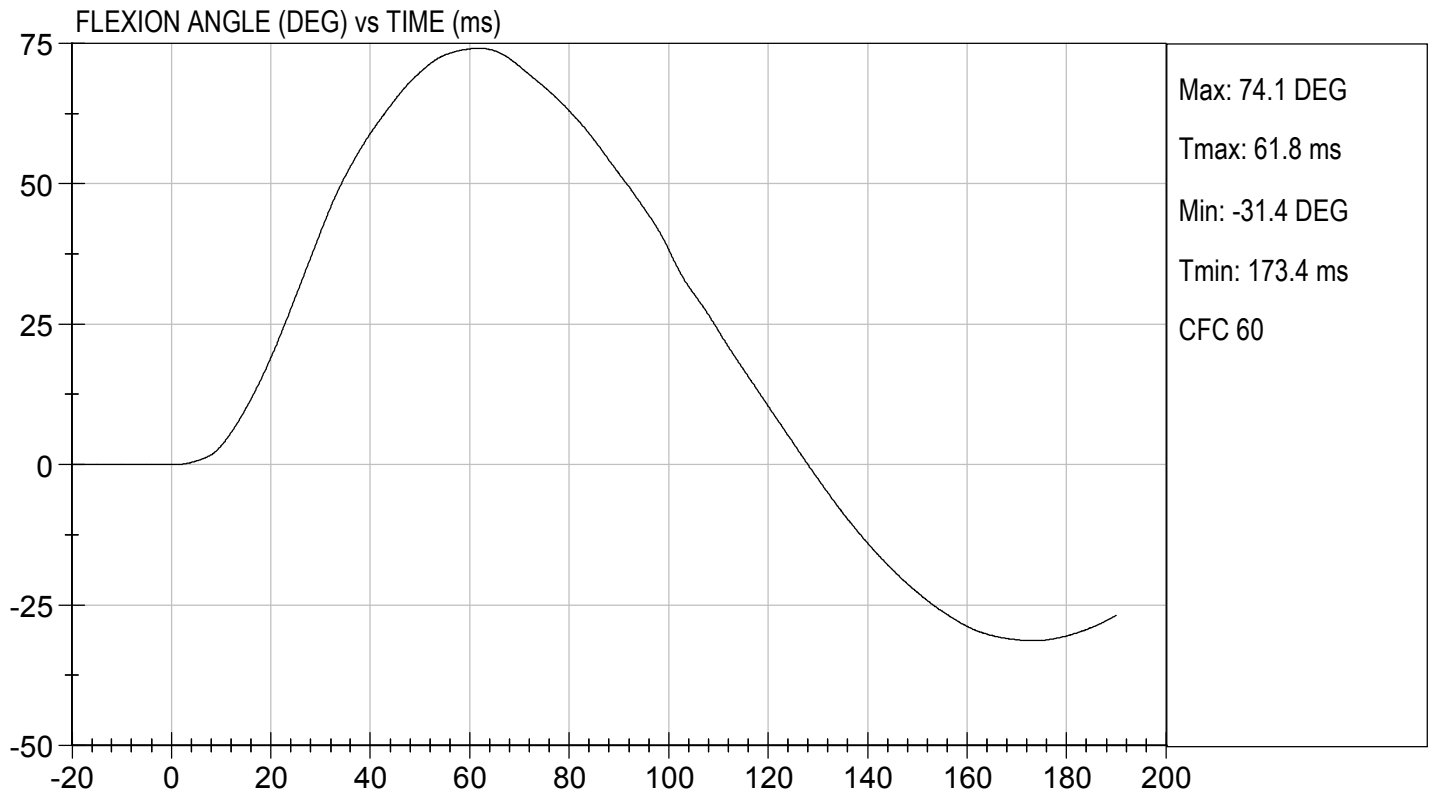
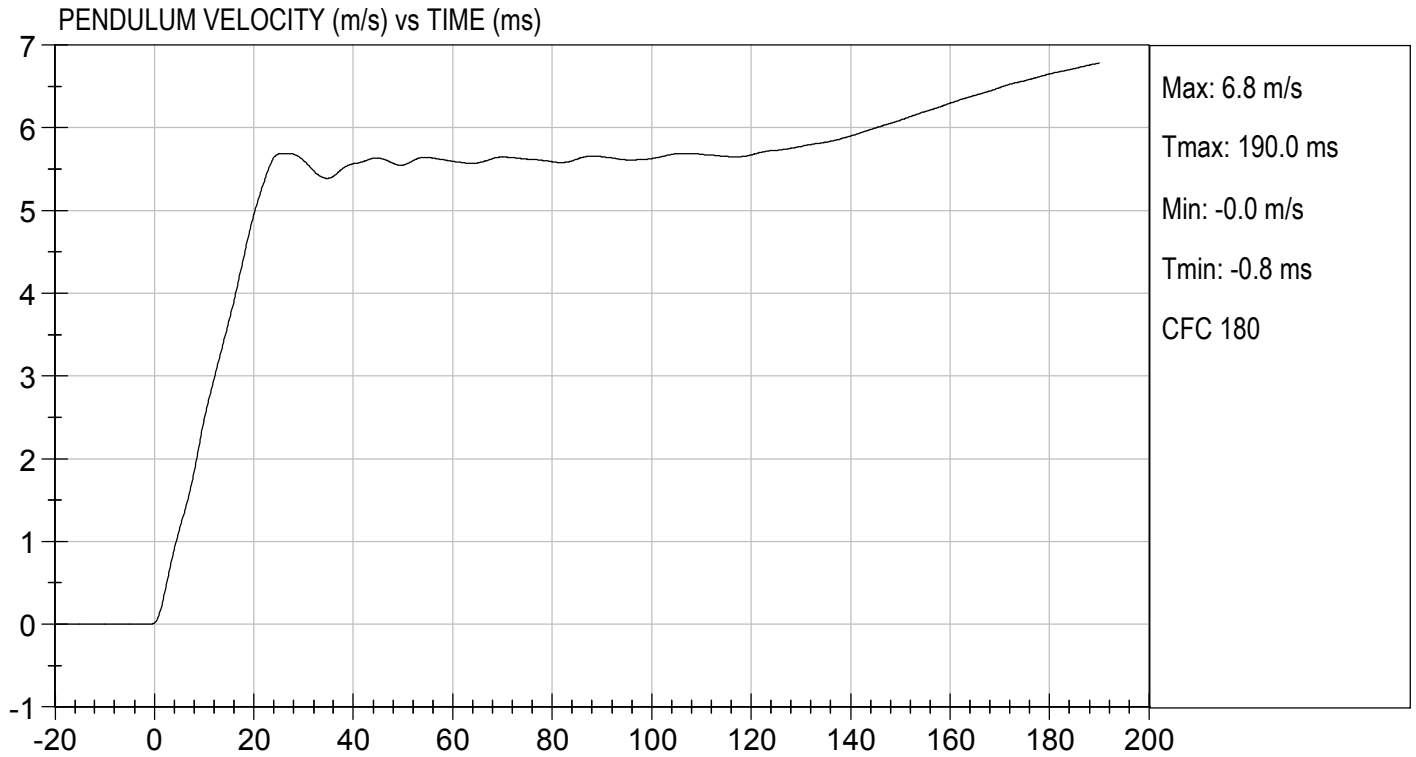
Laboratory Technician

10/03/2017

Test Date

B. F. H.

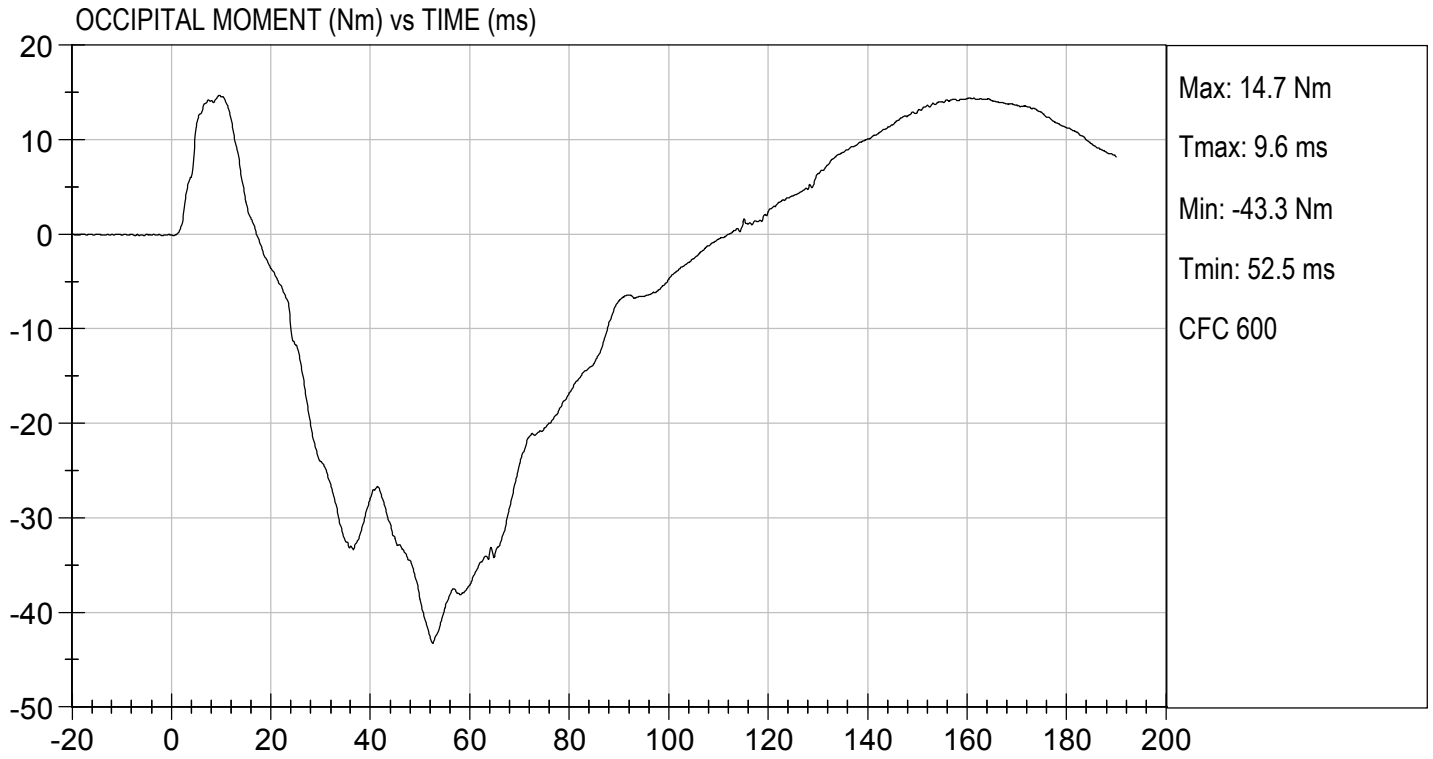
Approved By





TEST DESC: NECK BENDING
VELOCITY: 18.32 ft/s, 5.58 m/s

TEST DATE: 10/03/2017
TEST #: D172792

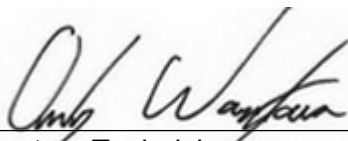


MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test ID: D172793

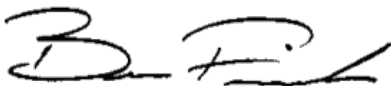
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 20.6 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 52 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.30 | Pass |
| Maximum Probe Acceleration | G's | 13 to 18 | 15 | Pass |
| Shoulder Displacement | mm | 28 to 37 | 33 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 17 to 22 | 18 | Pass |
| Overall Test Results | | | | Pass |



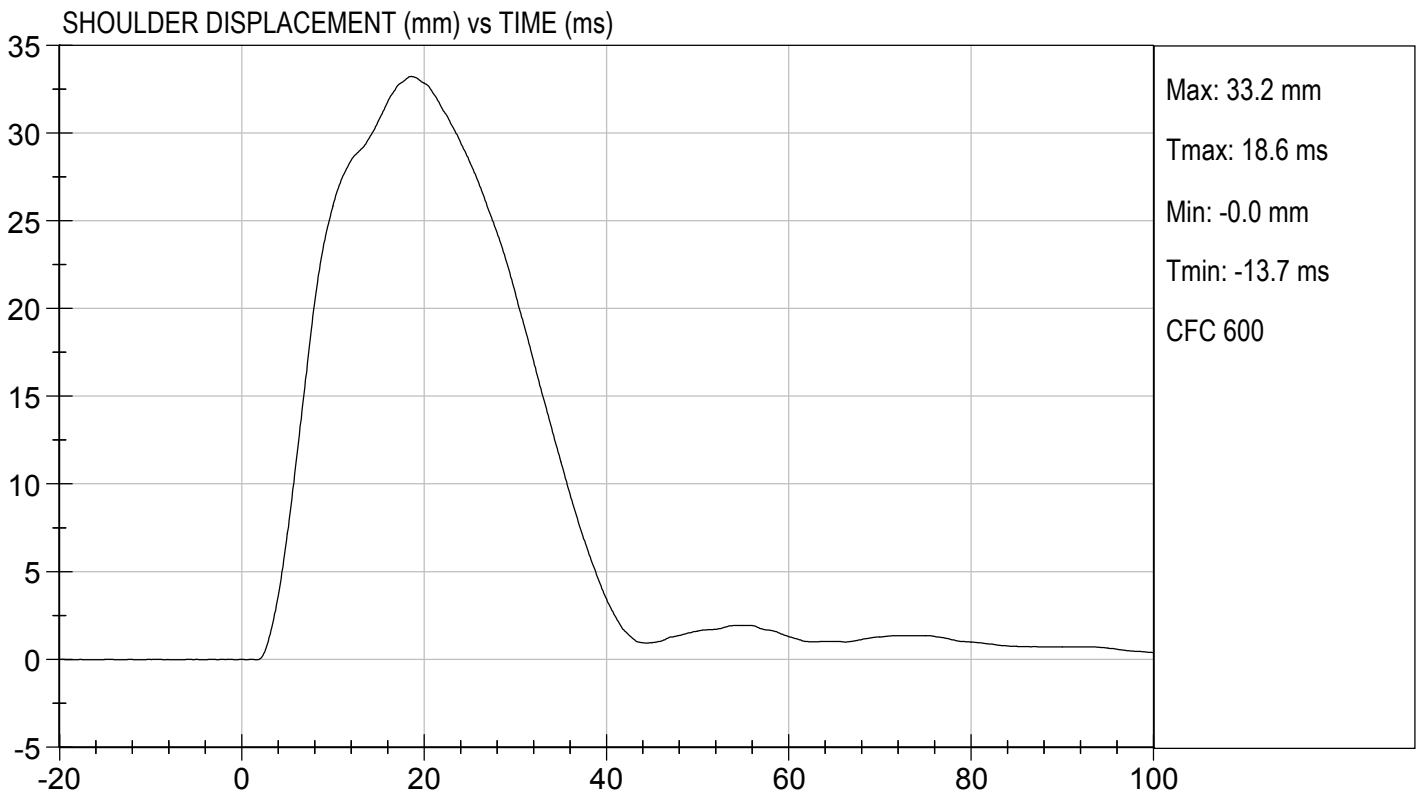
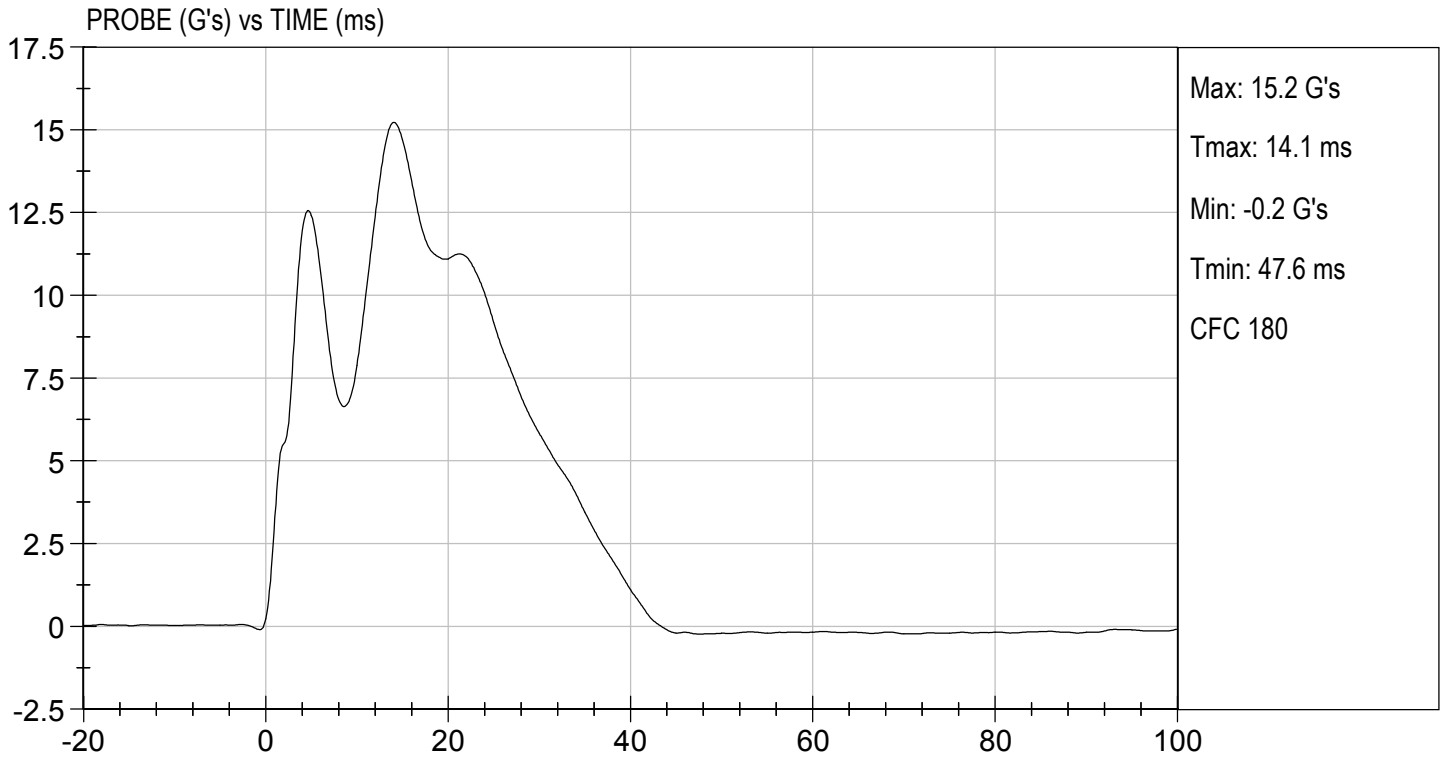
Laboratory Technician

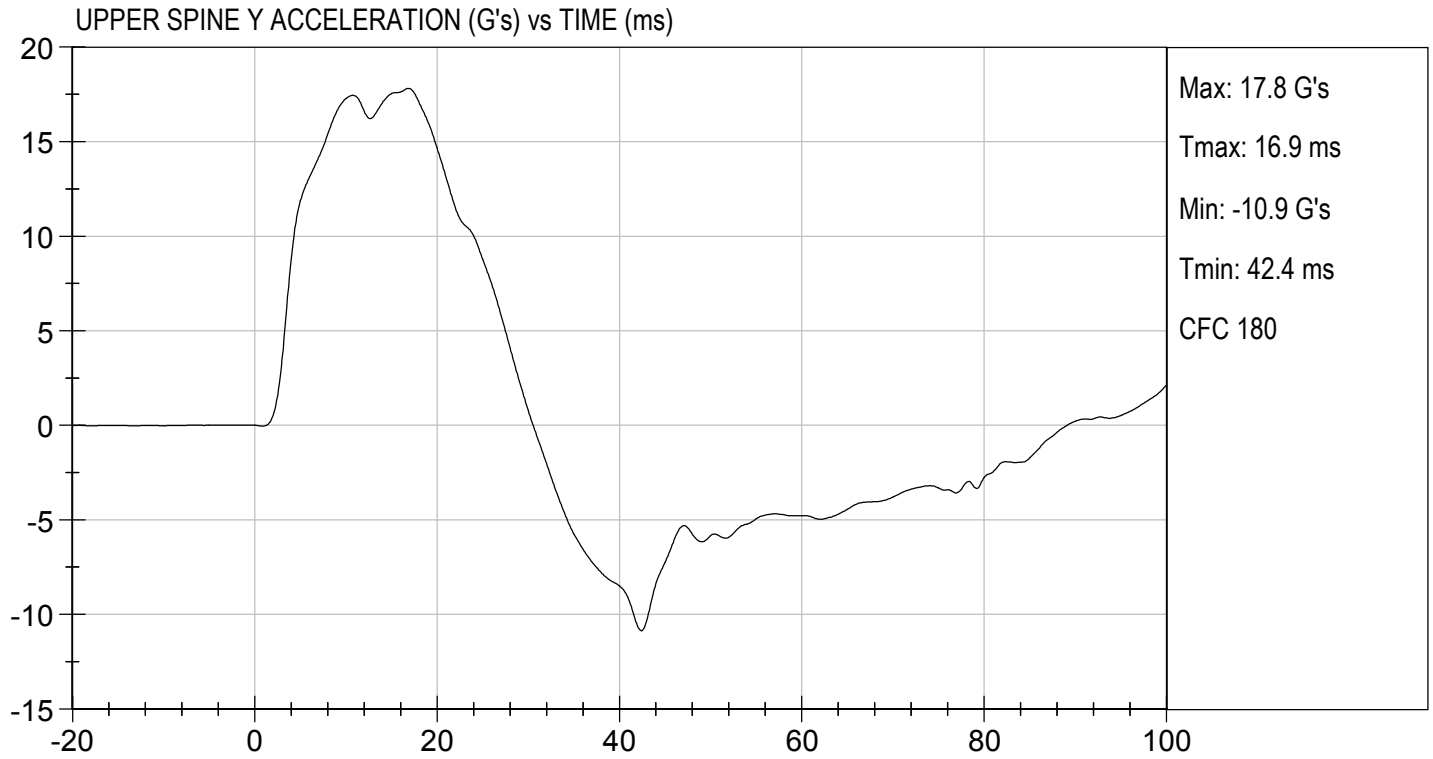
10/02/2017

Test Date



Approved By





**MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

Test I.D: D172794

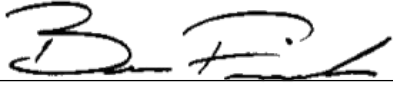
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 20.6 | Pass |
| Humidity | % | 10 to 70 | 52 | Pass |
| Impact Velocity | m/s | 6.60 to 6.80 | 6.77 | Pass |
| Maximum Probe Acceleration | G's | 30 to 36 | 31 | Pass |
| Shoulder Displacement | mm | 31 to 40 | 38 | Pass |
| Upper Rib Displacement | mm | 25 to 32 | 30 | Pass |
| Middle Rib Displacement | mm | 30 to 36 | 33 | Pass |
| Lower Rib Displacement | mm | 32 to 38 | 35 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 34 to 43 | 35 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 29 to 37 | 32 | Pass |
| Overall Test Results | | | | Pass |



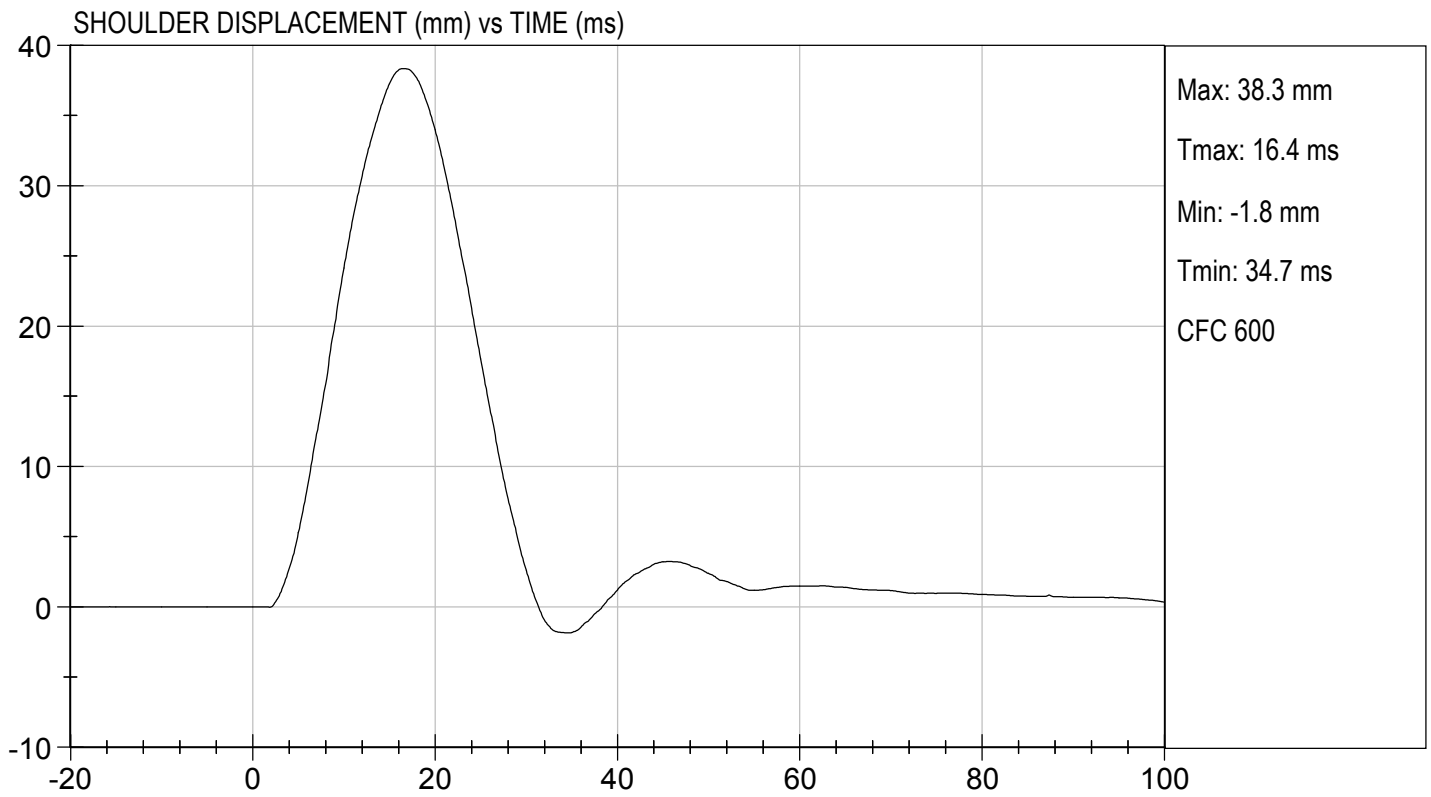
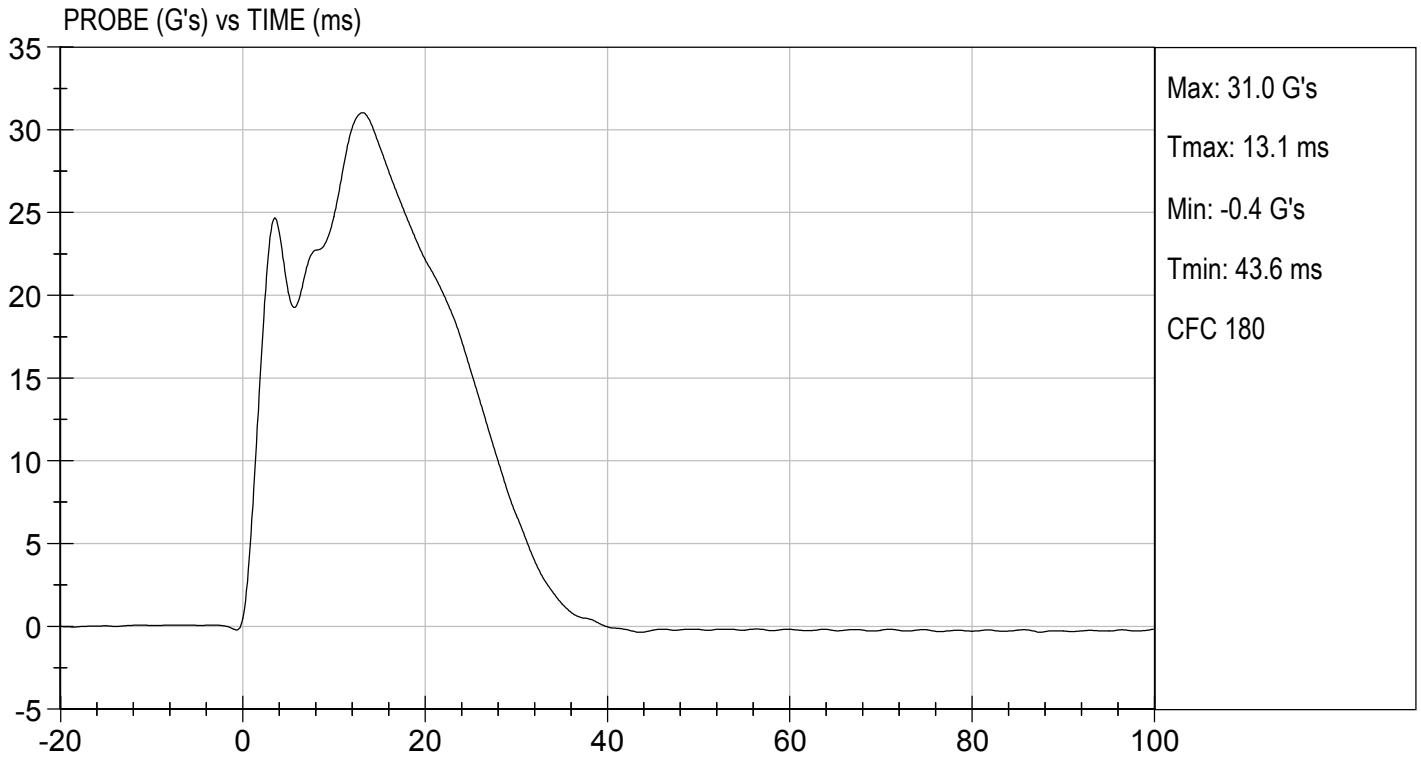
 Laboratory Technician

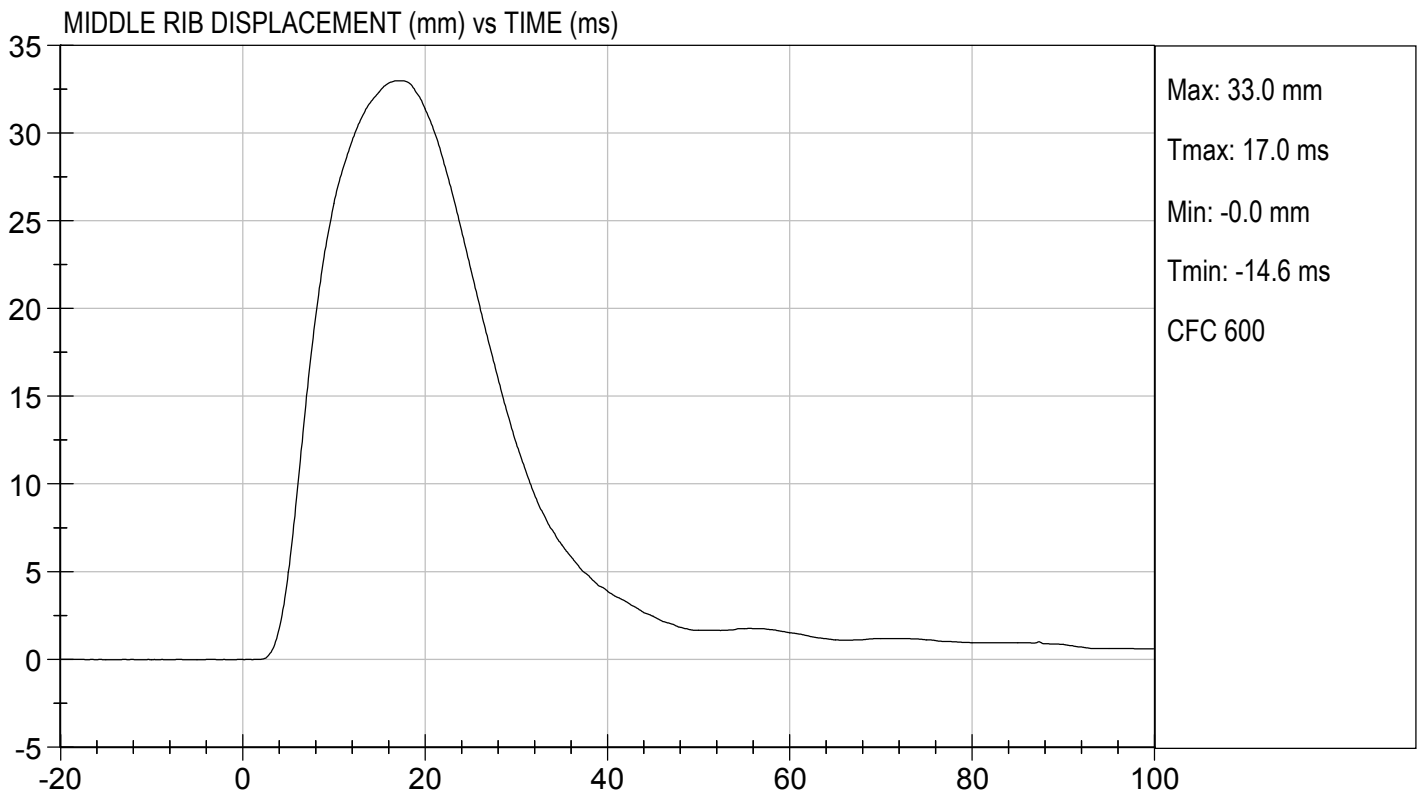
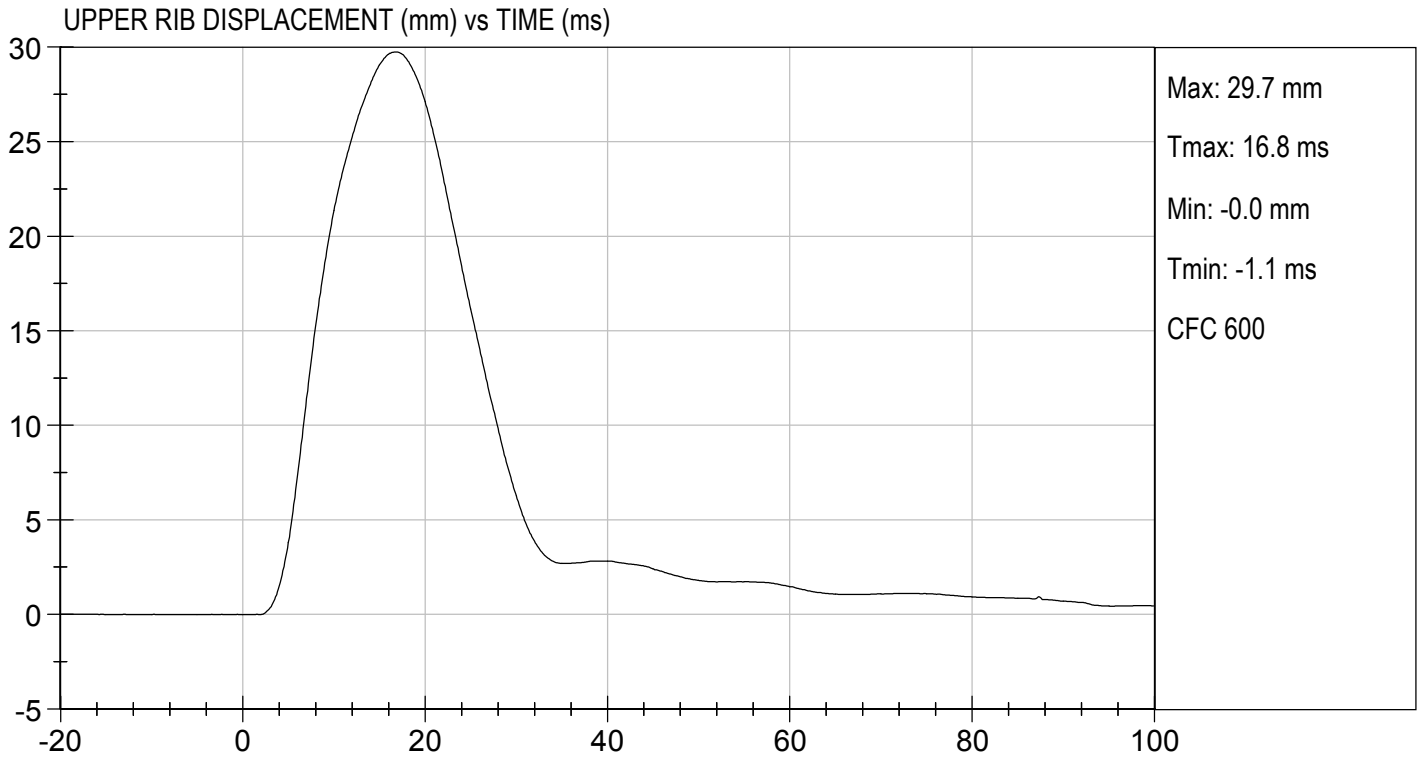
10/02/2017

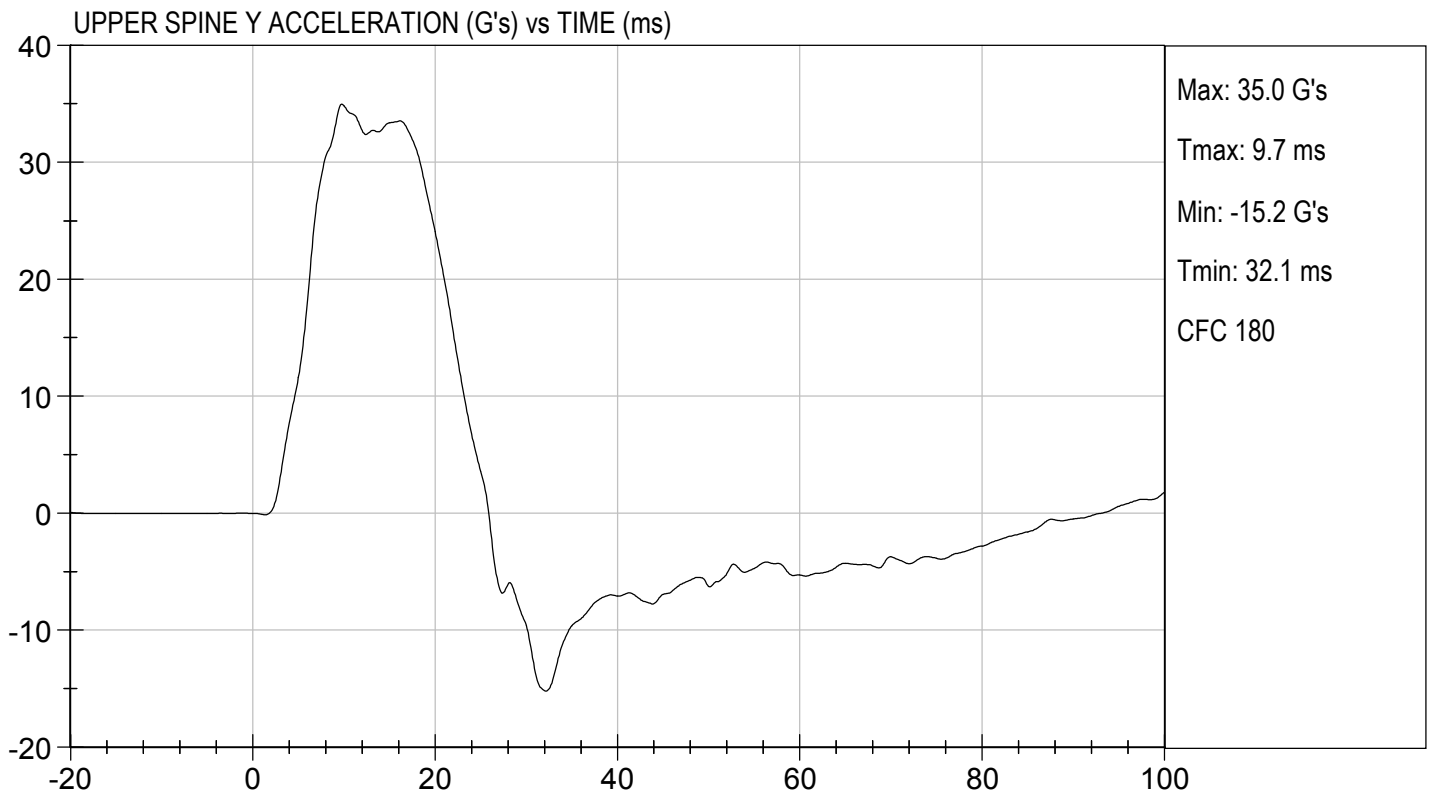
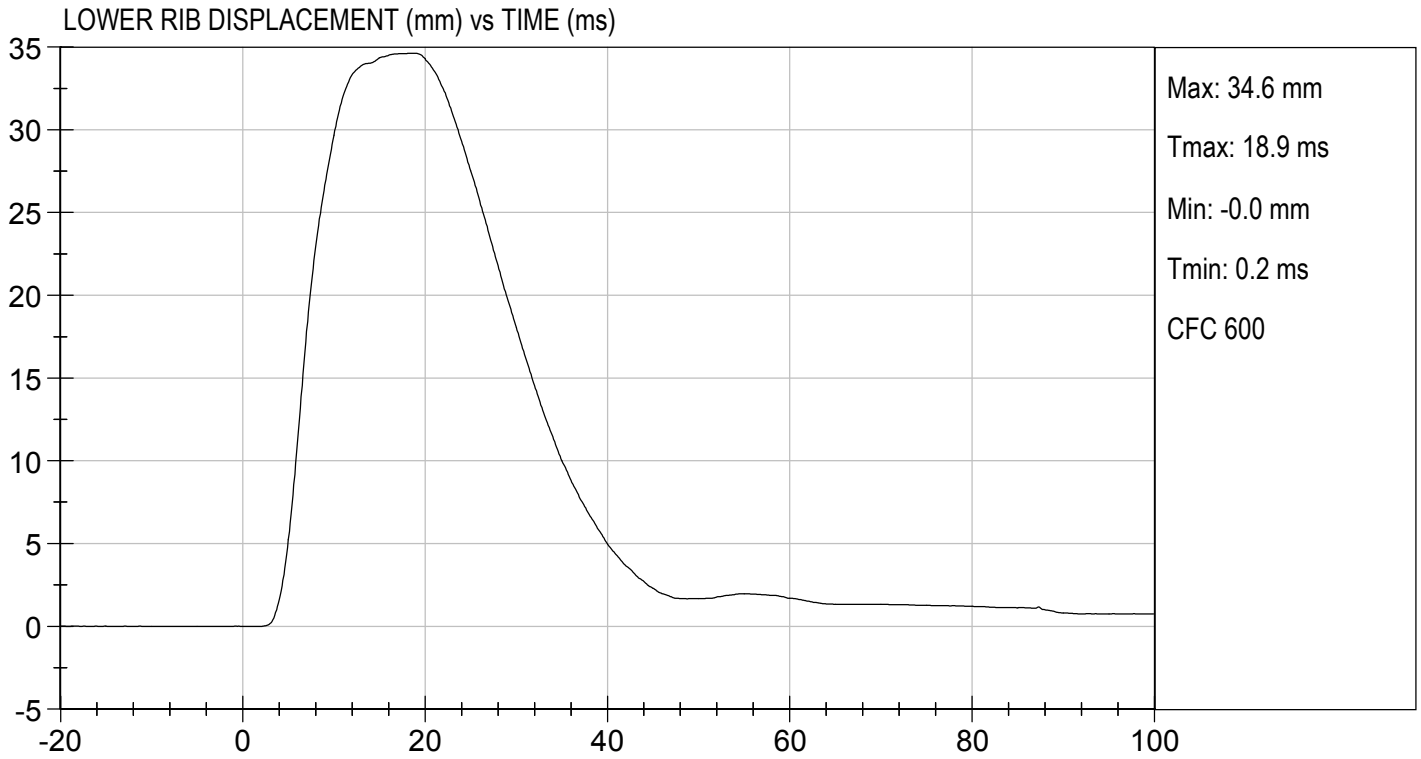
 Test Date

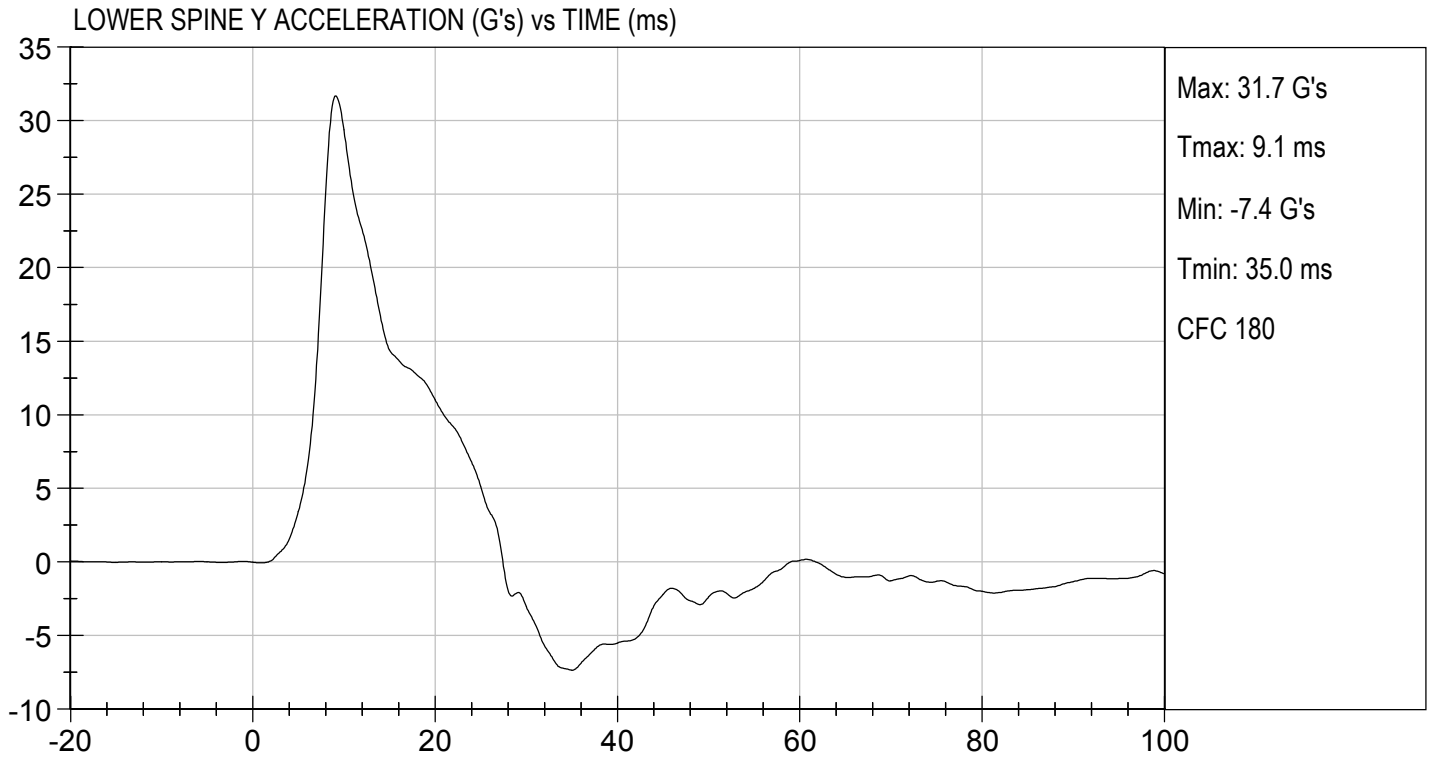


 Approved By







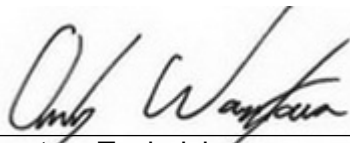


MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D172795

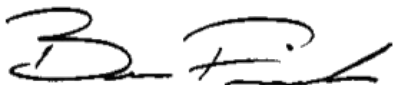
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-------------|
| Temperature | deg C | 20.6 to 22.2 | 20.6 | Pass |
| Humidity | % | 10 to 70 | 52 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.30 | Pass |
| Maximum Probe Acceleration | G's | 14 to 18 | 15 | Pass |
| Upper Rib Displacement | mm | 32 to 40 | 38 | Pass |
| Middle Rib Displacement | mm | 39 to 45 | 43 | Pass |
| Lower Rib Displacement | mm | 35 to 43 | 41 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 13 to 17 | 15 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 7 to 11 | 9 | Pass |
| Overall Test Results | | | | Pass |



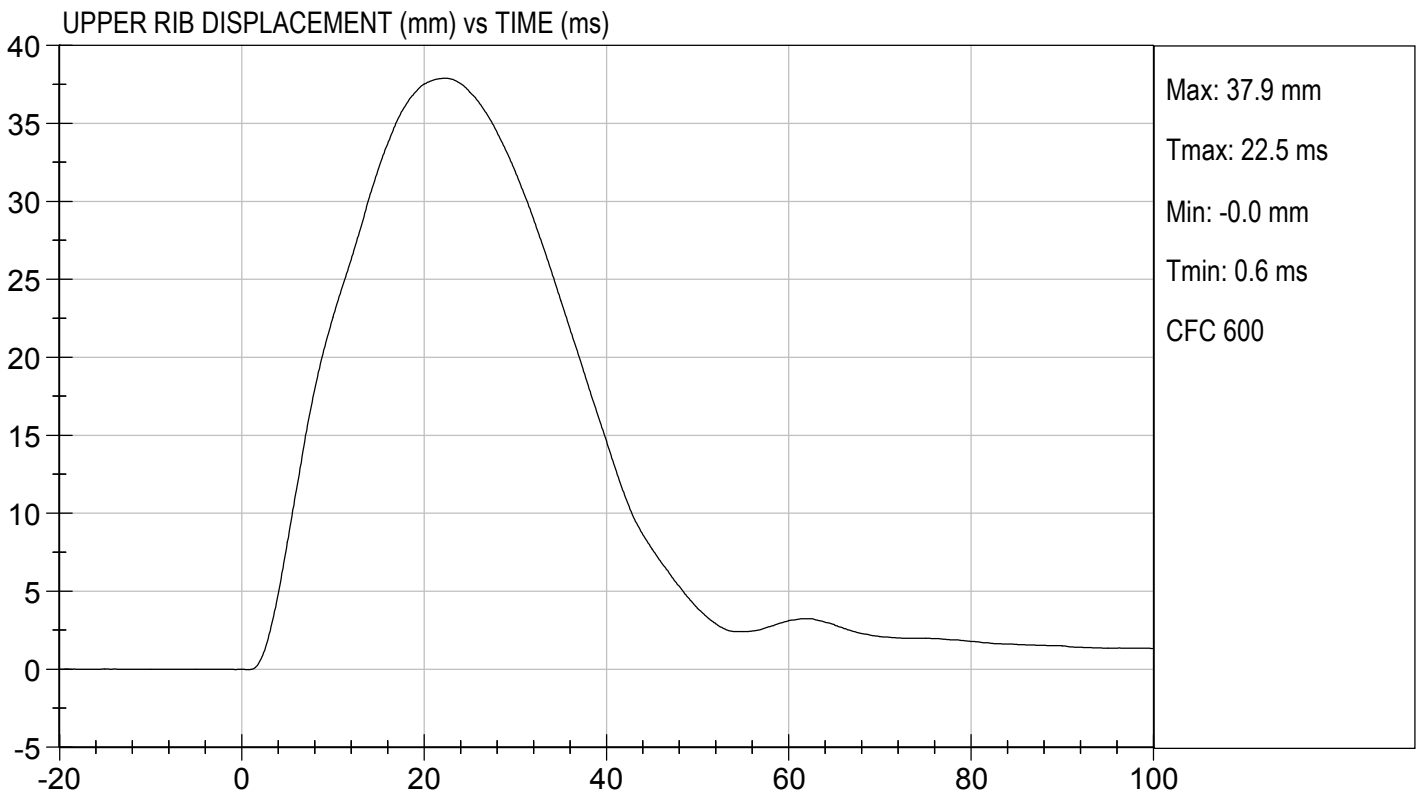
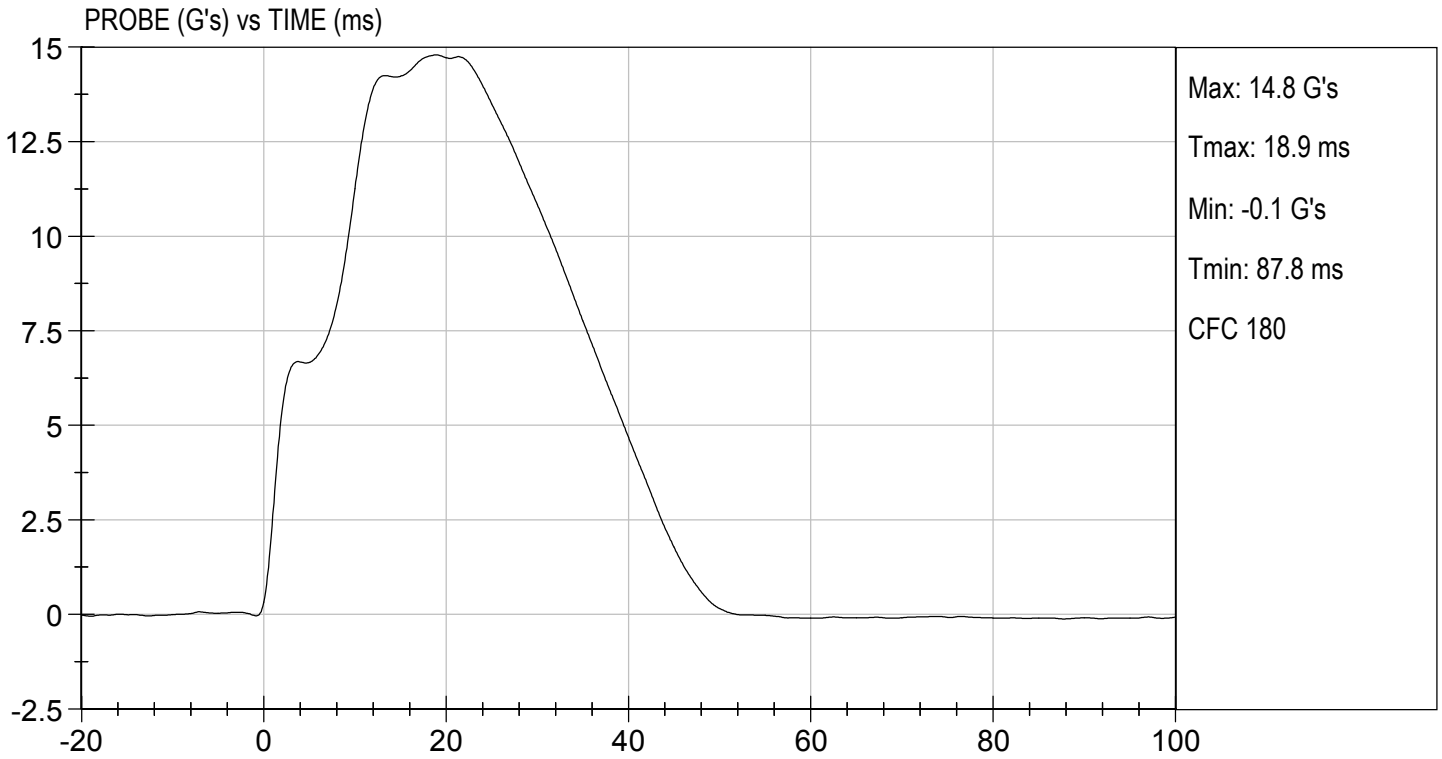
Laboratory Technician

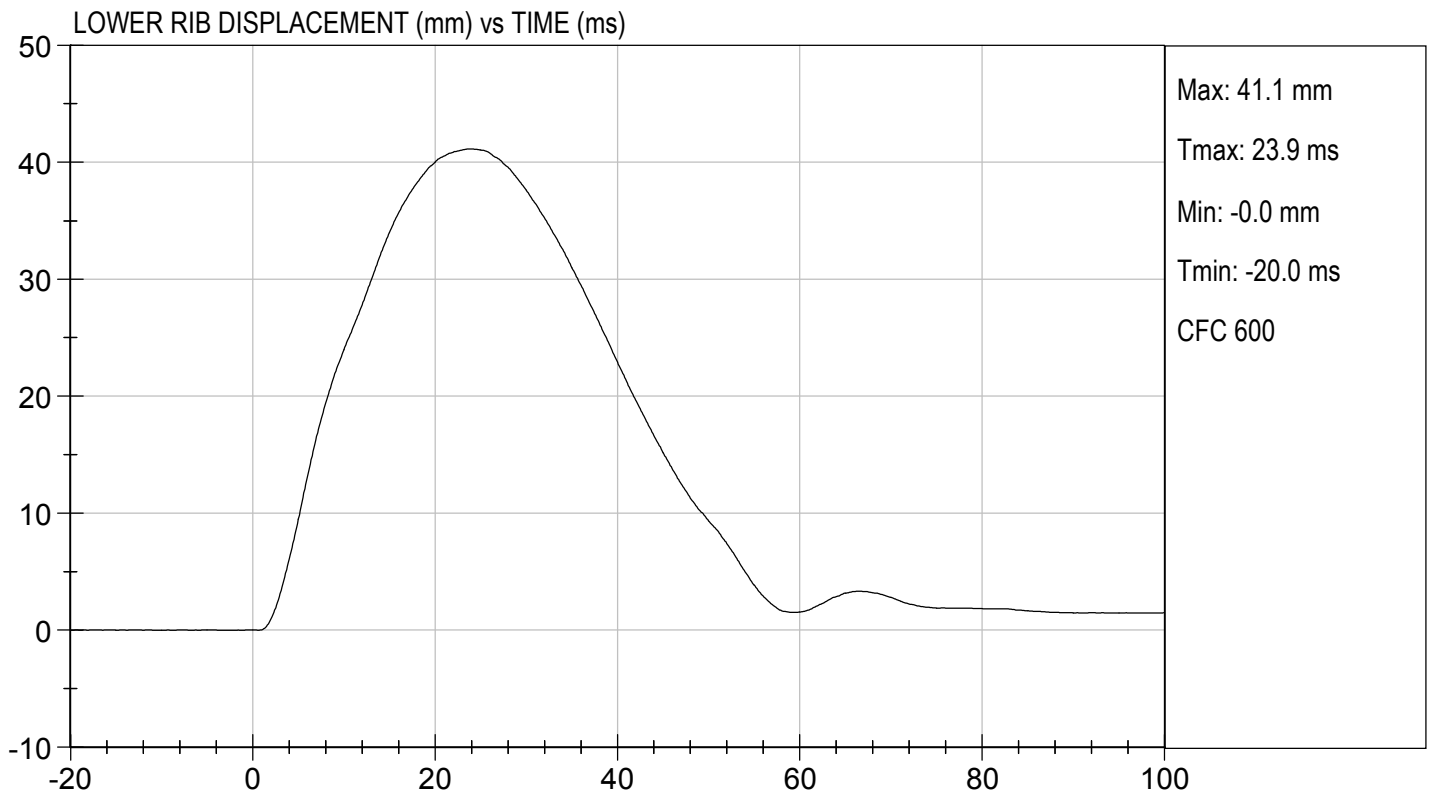
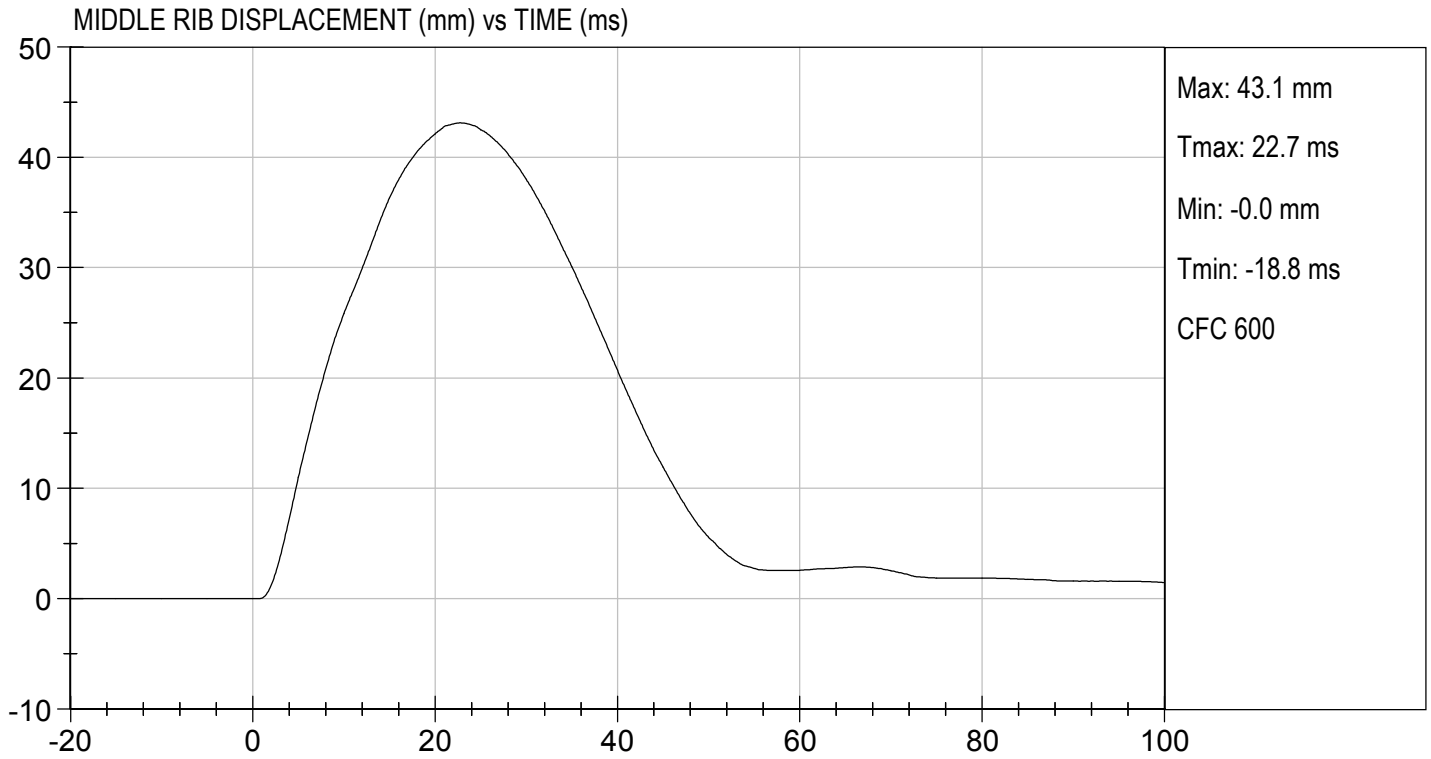
10/02/2017

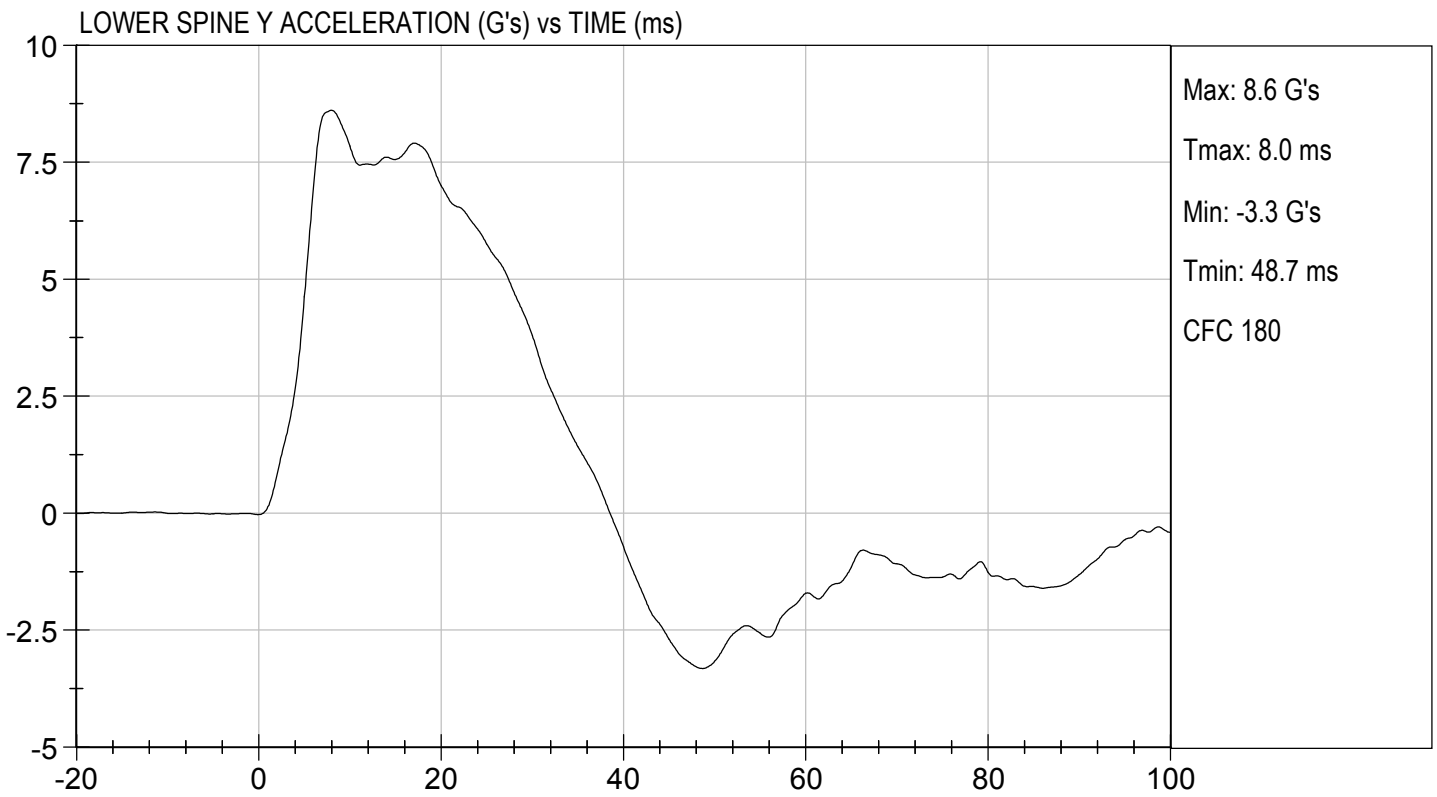
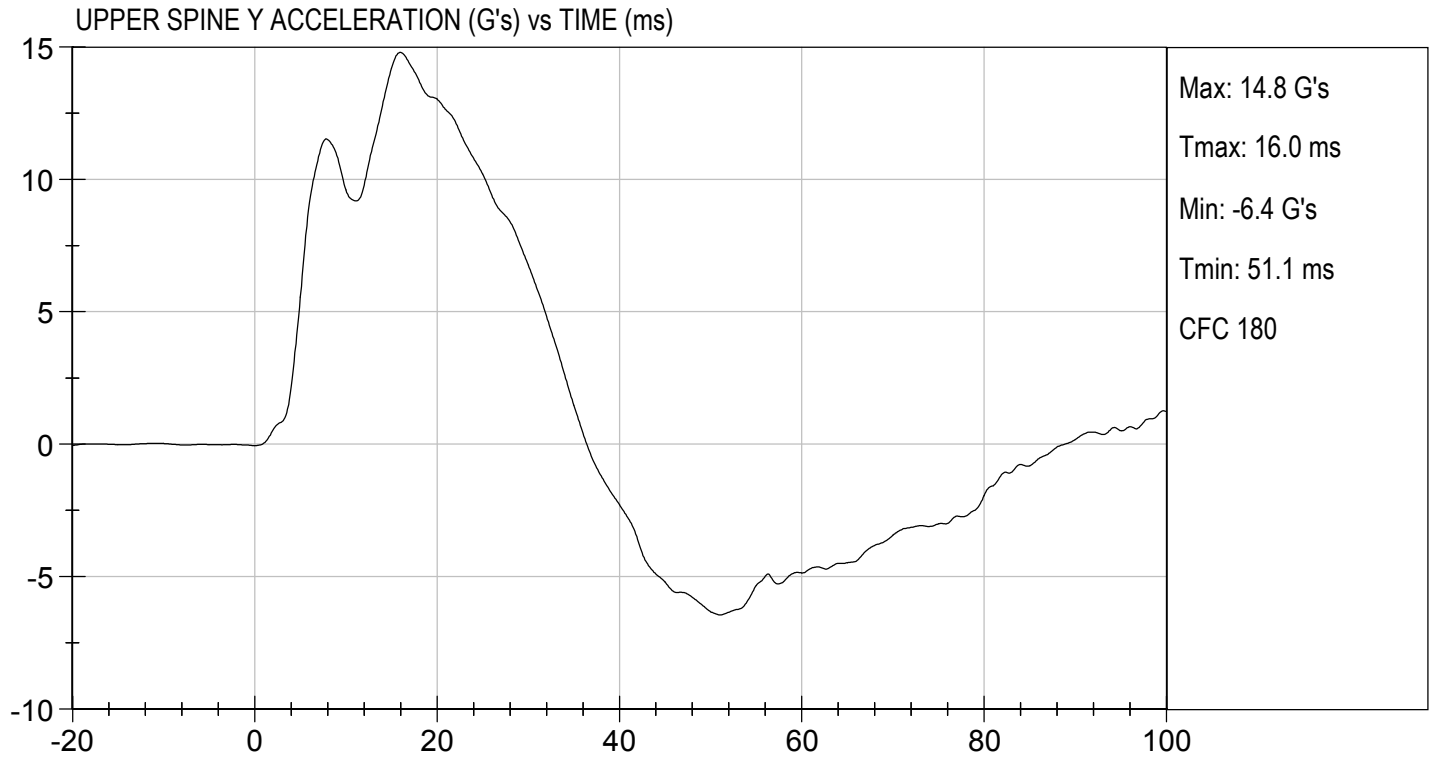
Test Date



Approved By





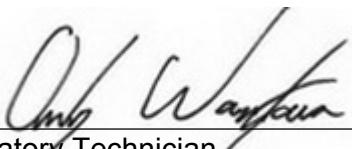


MGA RESEARCH CORPORATION
ABDOMINAL IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D172796

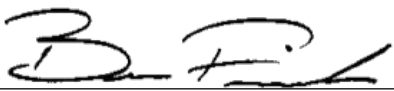
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-------------|
| Temperature | deg C | 20.6 to 22.2 | 20.6 | Pass |
| Humidity | % | 10 to 70 | 52 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.27 | Pass |
| Maximum Probe Acceleration | G's | 12 to 16 | 13 | Pass |
| Upper Abdomen Rib Displacement | mm | 36 to 47 | 40 | Pass |
| Lower Abdomen Rib Displacement | mm | 33 to 44 | 38 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 9 to 14 | 10 | Pass |
| Overall Test Results | | | | Pass |



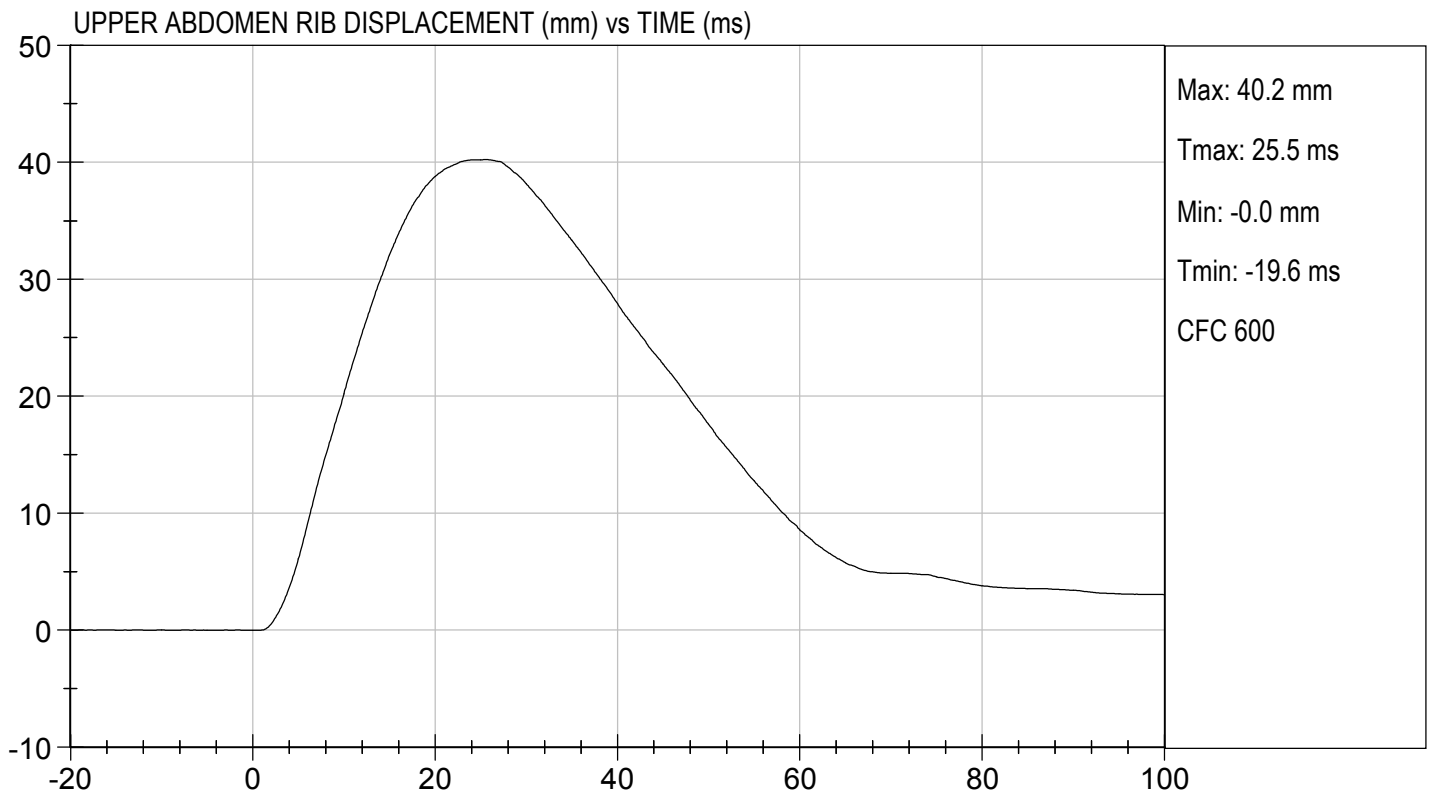
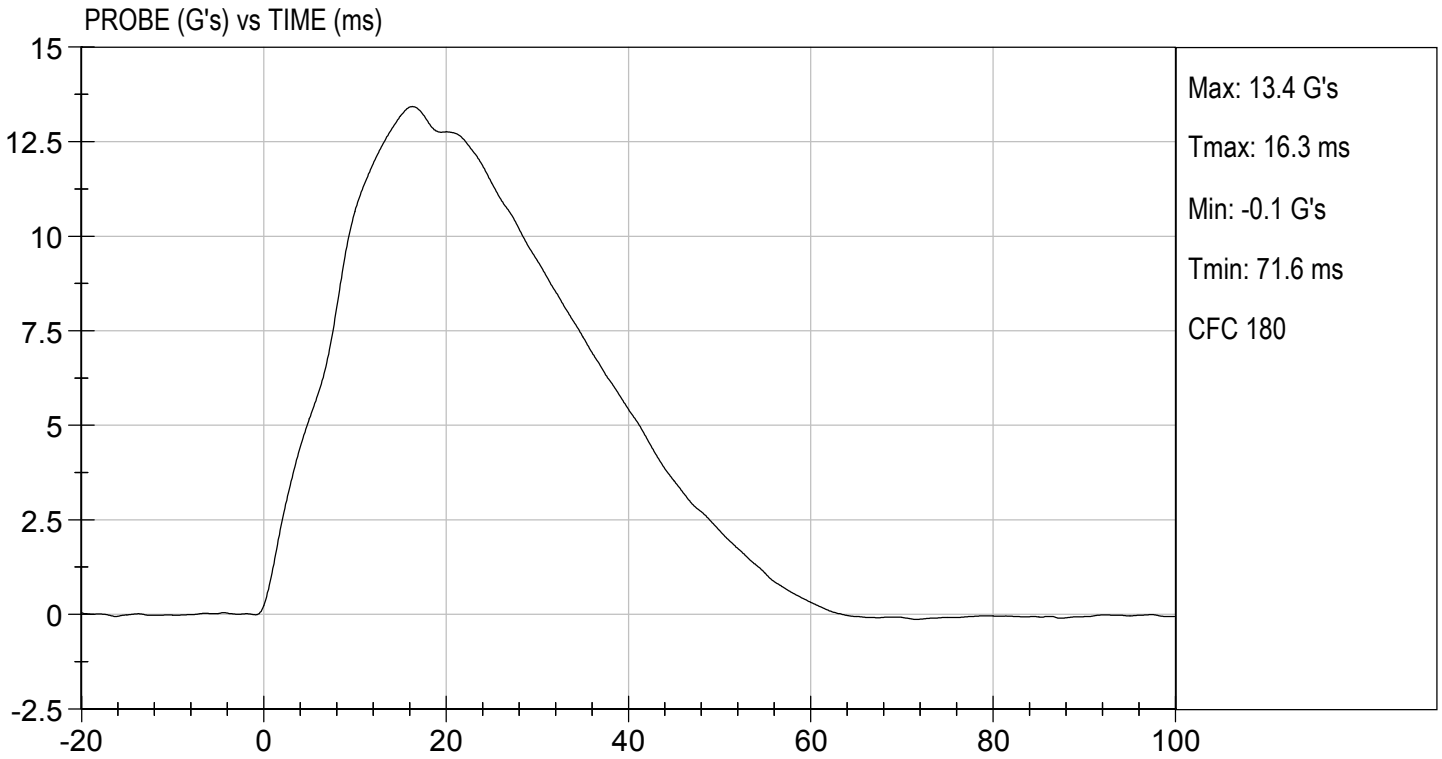
 Laboratory Technician

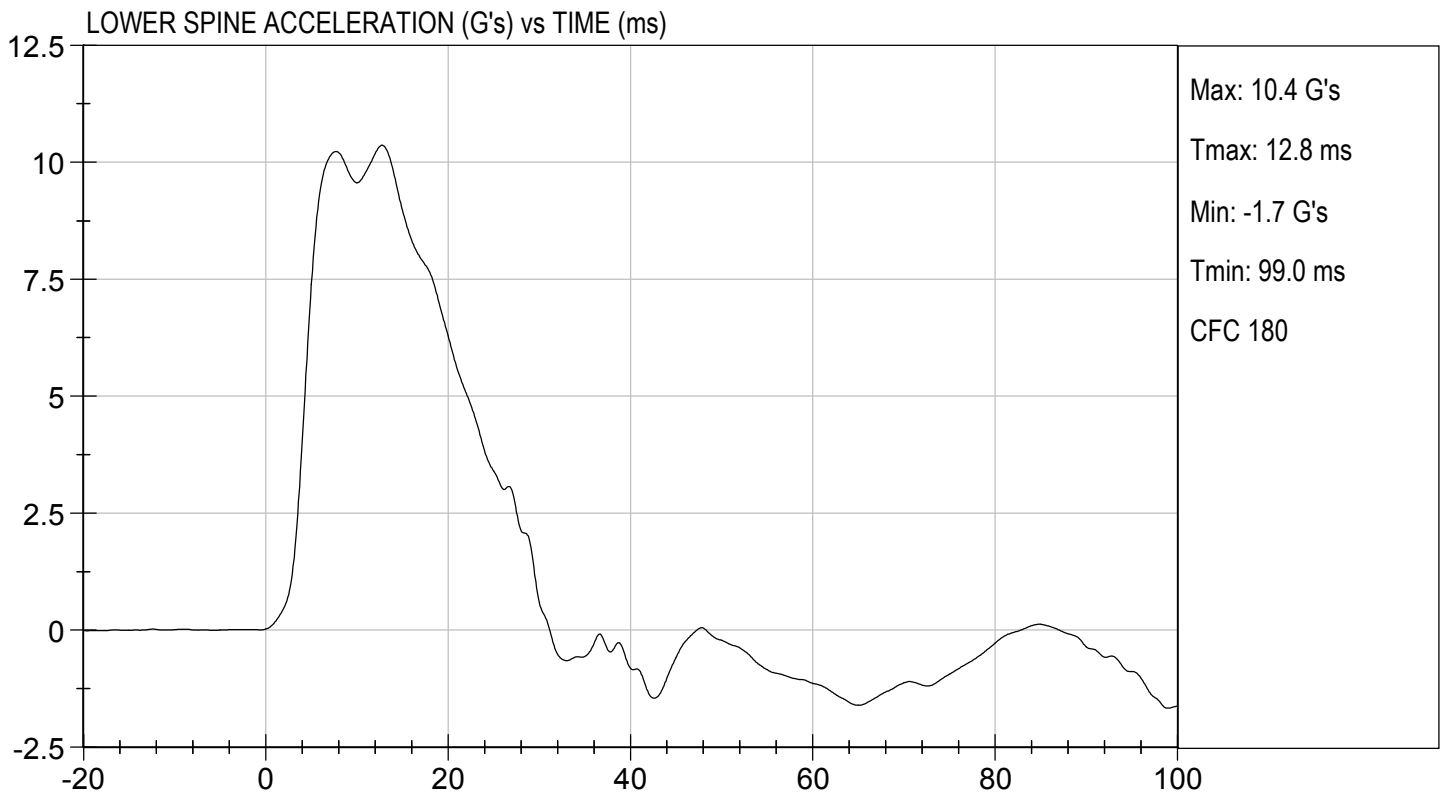
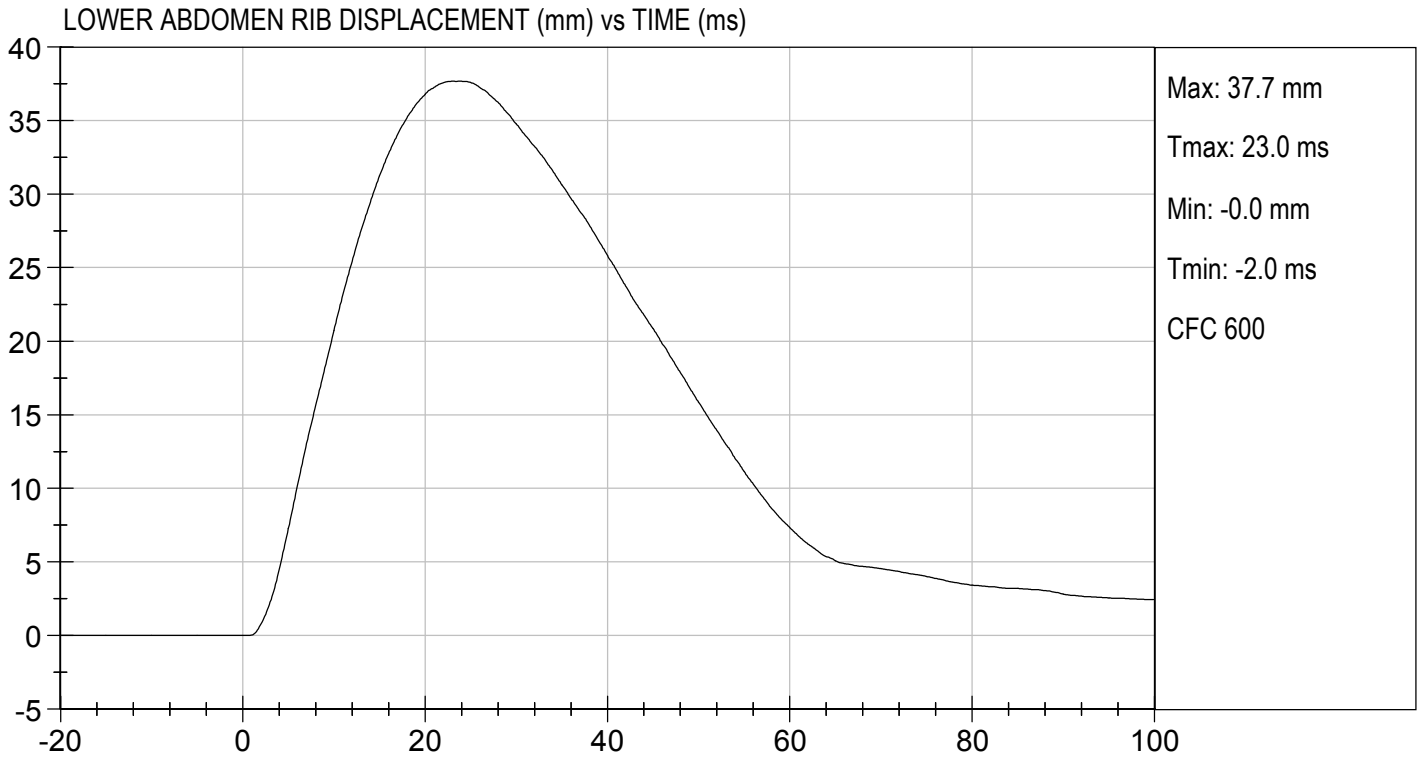
10/02/2017

 Test Date



 Approved By



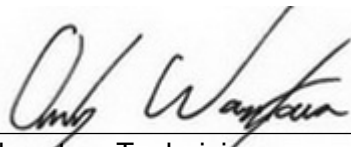


MGA RESEARCH CORPORATION
PELVIS IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D172797

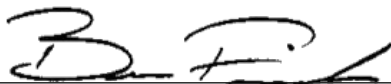
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 20.6 | Pass |
| Humidity | % | 10 to 70 | 52 | Pass |
| Impact Velocity | m/s | 6.60 to 6.80 | 6.60 | Pass |
| Maximum Probe Acceleration | G's | 38 to 47 | 42 | Pass |
| Pelvis Y Acceleration After 6 ms | G's | 34 to 42 | 42 | Pass |
| Peak Acetabulum Force | N | 3600 to 4300 | 3,820 | Pass |
| Overall Test Results | | | | Pass |



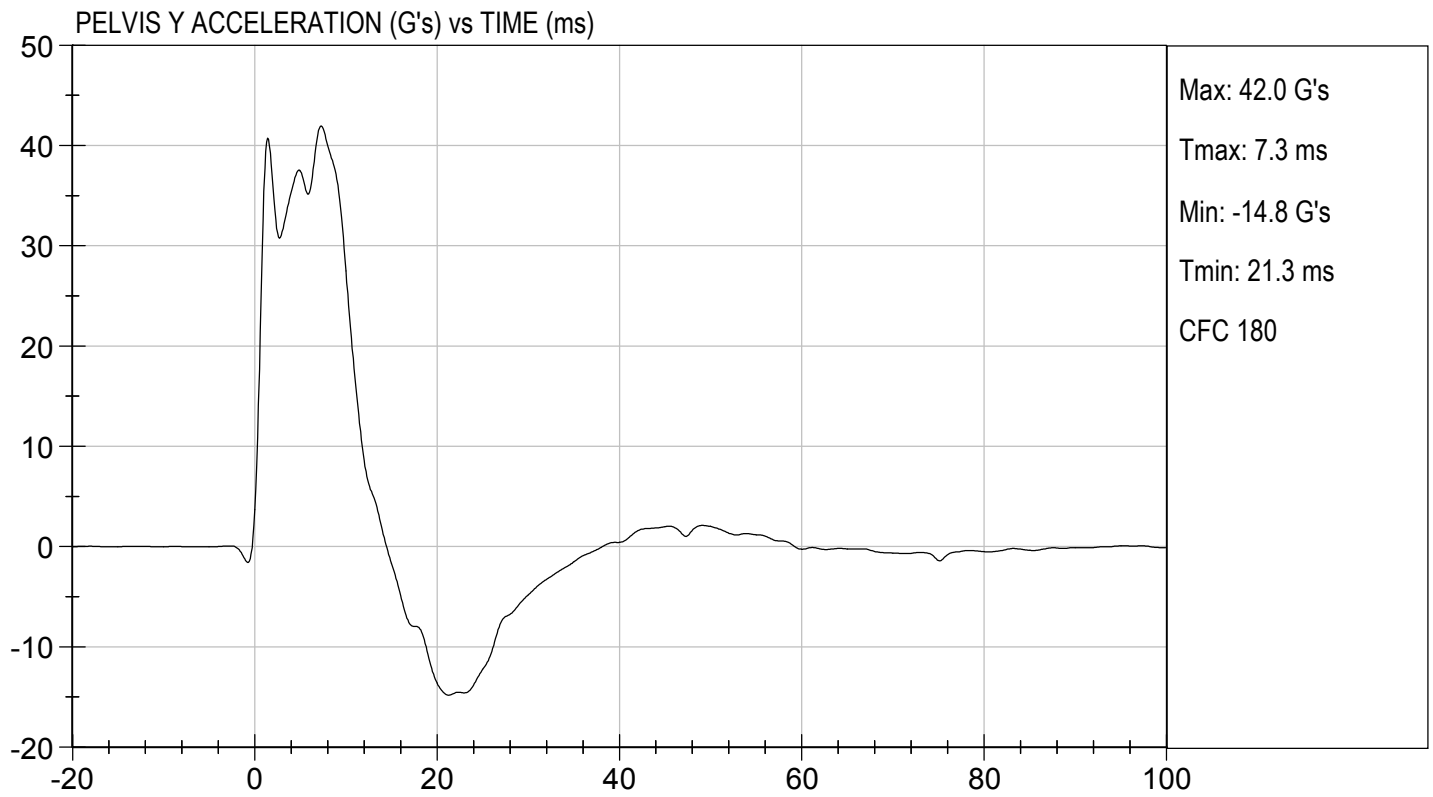
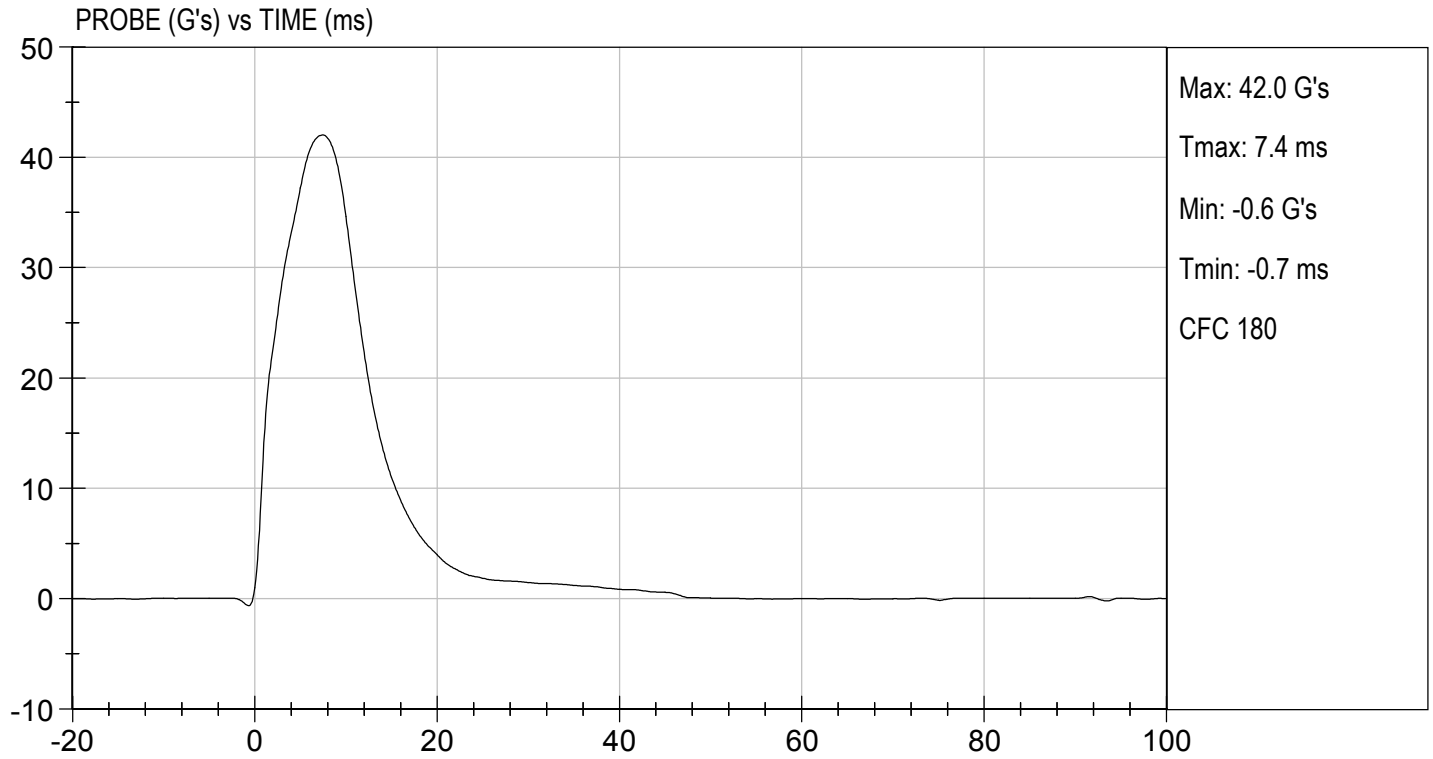
Laboratory Technician

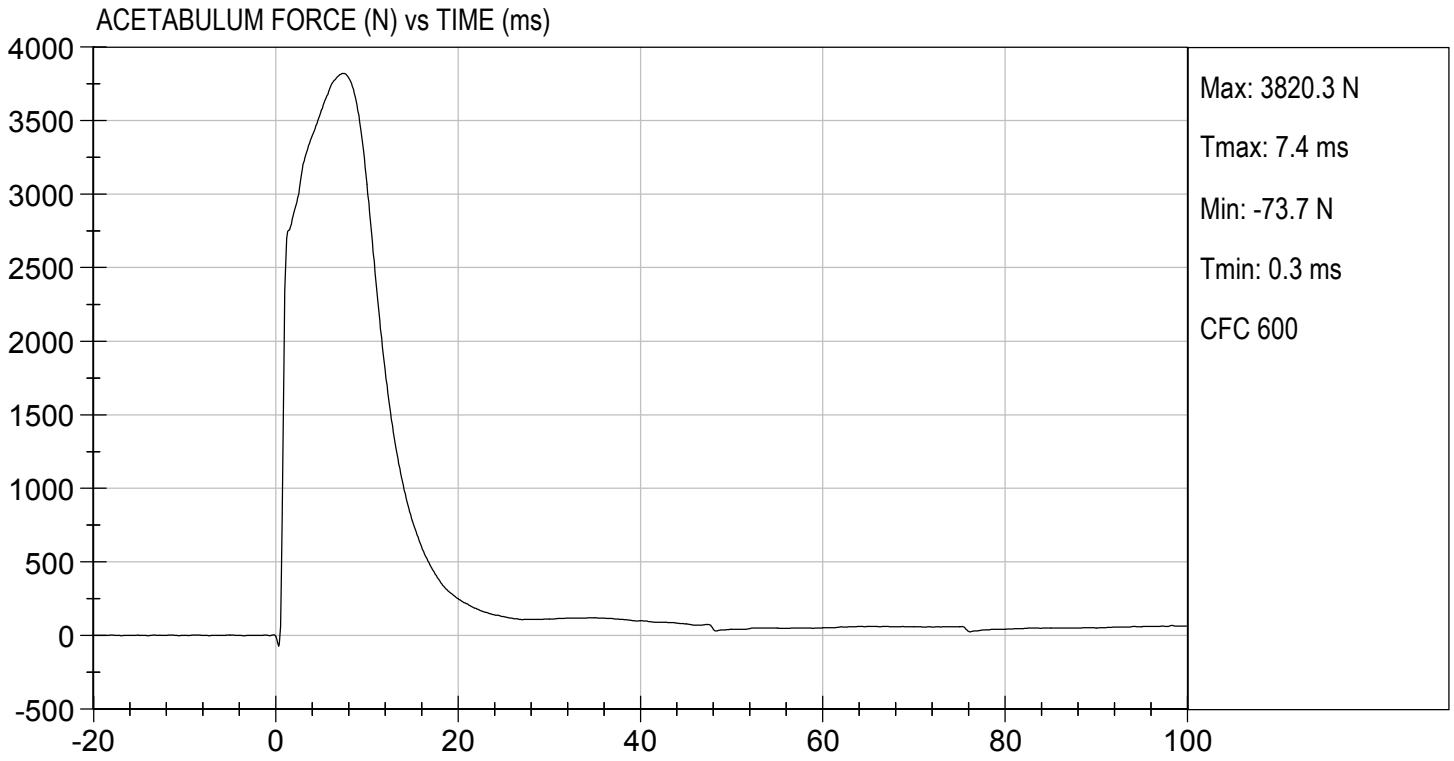
10/02/2017

Test Date



Approved By



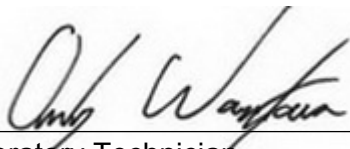


MGA RESEARCH CORPORATION
ILIAC IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

Test I.D: D172798

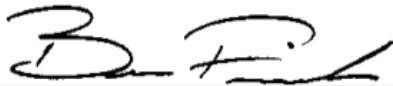
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|-----------------------------|-------|---------------|--------|-------------|
| Temperature | deg C | 20.6 to 22.2 | 20.6 | Pass |
| Humidity | % | 10 to 70 | 52 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.34 | Pass |
| Maximum Probe Acceleration | G's | 36 to 45 | 38 | Pass |
| Pelvis Y Acceleration | G's | 28 to 39 | 31 | Pass |
| Peak Pelvis Iliac Force | N | 4100 to 5100 | 4,380 | Pass |
| Overall Test Results | | | | Pass |



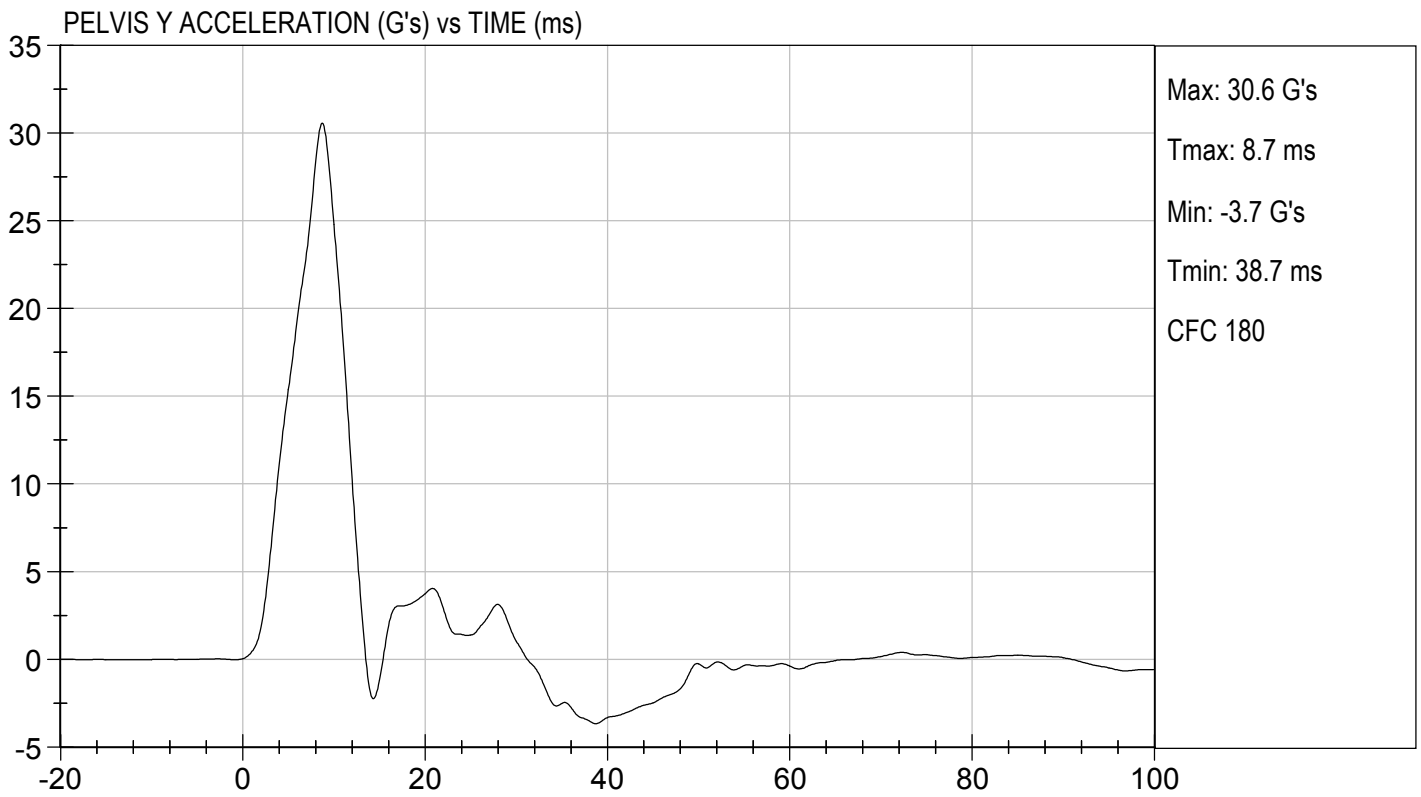
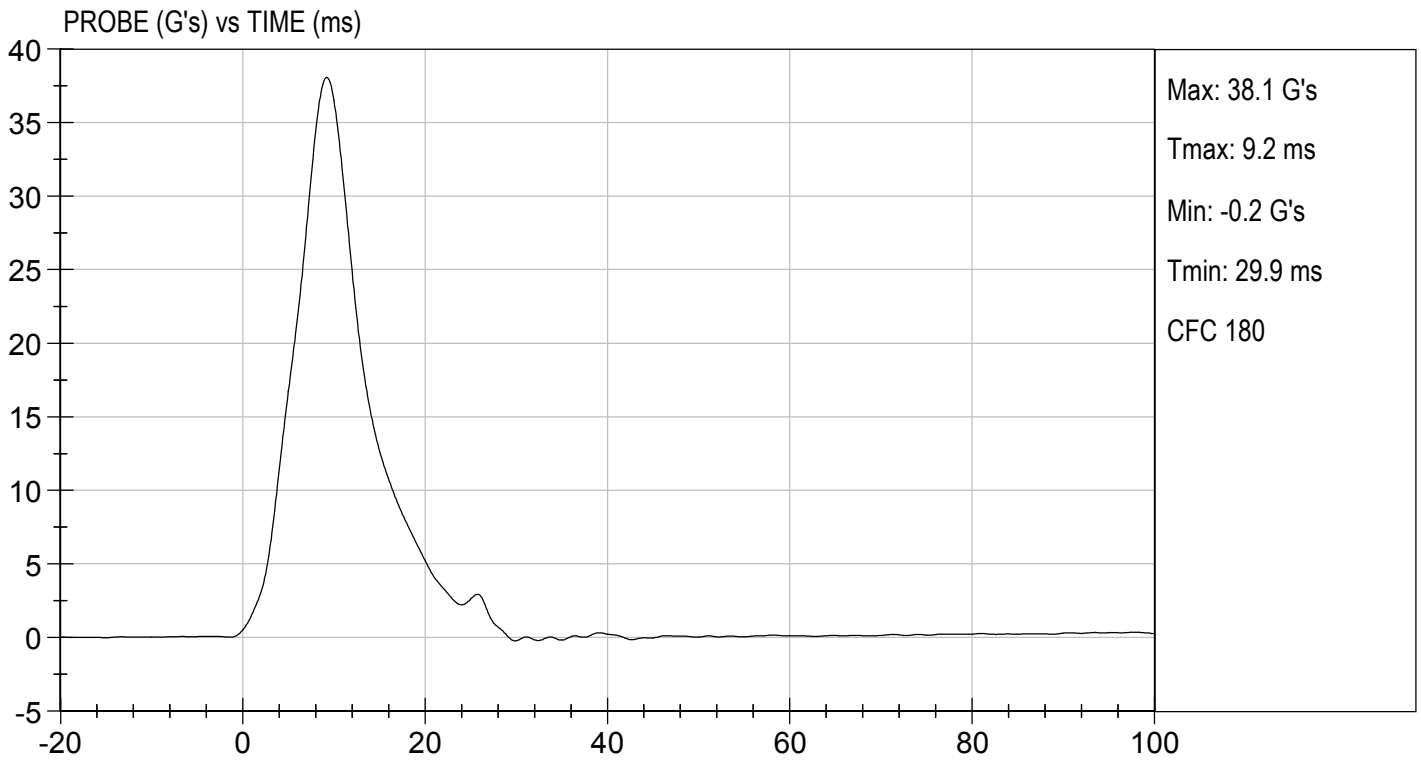
Laboratory Technician

10/02/2017

Test Date



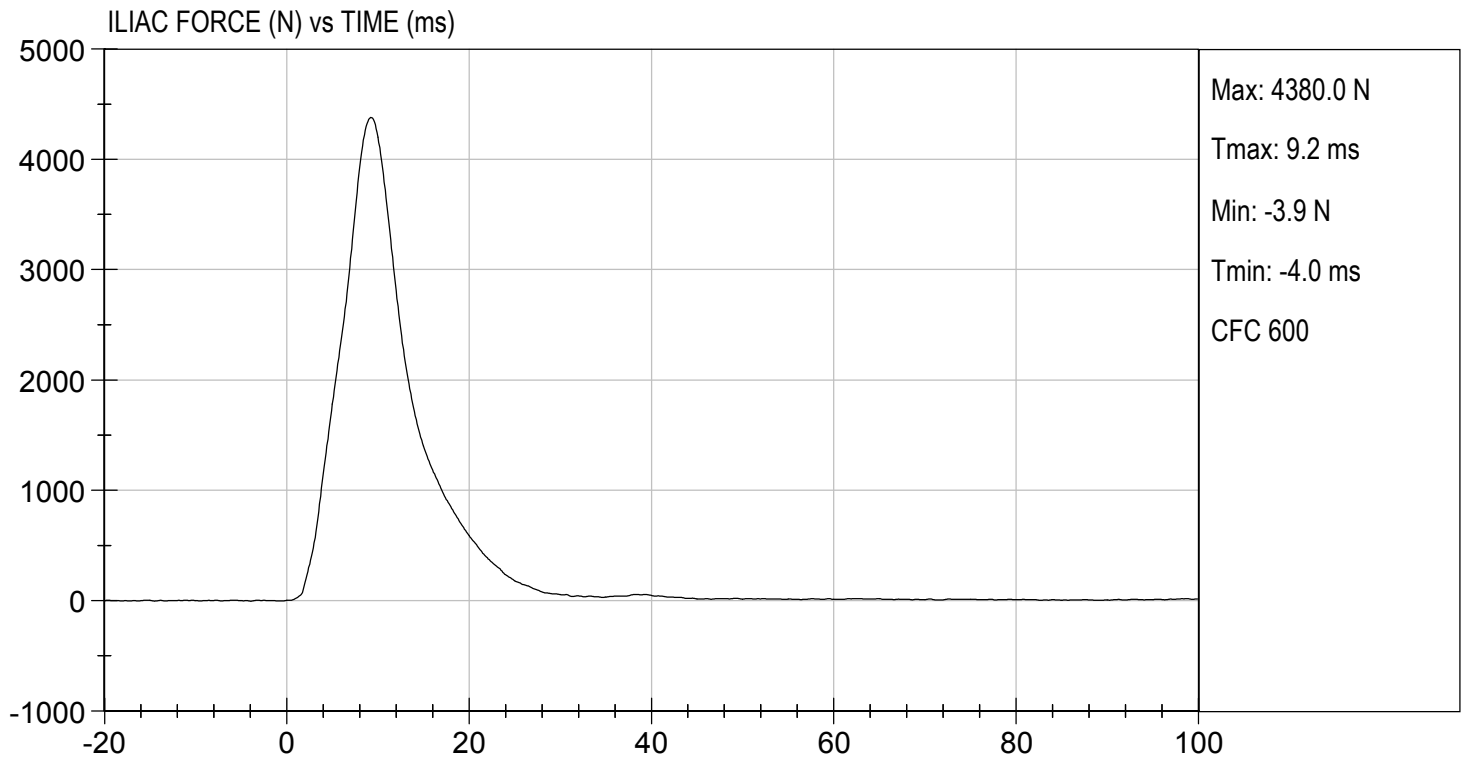
Approved By





TEST DESC: ILLIAC
VELOCITY: 14.25 ft/s, 4.34 m/s

TEST DATE: 10/02/2017
TEST #: D172798



SID-IIsD External Measurements
SN: 296


| No. | Name | Spec. (mm) | Result | Pass/Fail |
|------------|-------------------------------|-------------------|---------------|------------------|
| A | Sitting Height | 772 - 788 | 784 | Pass |
| B | Shoulder Pivot Height | 437 - 453 | 442 | Pass |
| C | H-point Height | 79 - 89 | 83 | Pass |
| D | H-point from Seatback | 141 - 151 | 145 | Pass |
| E | Shoulder Pivot from Backline | 97 - 107 | 99 | Pass |
| F | Thigh Clearance | 119 - 135 | 121 | Pass |
| G | Head Breadth | 140 - 148 | 142 | Pass |
| H | Head Back from Backline | 40 - 46 | 45 | Pass |
| I | Head Depth | 178 - 188 | 180 | Pass |
| J | Head Circumference | 541 - 551 | 548 | Pass |
| K | Buttock to Knee Length | 514 - 540 | 535 | Pass |
| L | Popliteal Height | 343 - 369 | 358 | Pass |
| M | Knee Pivot to Floor Height | 392 - 409 | 404 | Pass |
| N | Buttock Popliteal Length | 416 - 442 | 435 | Pass |
| O | Chest Depth w/o Jacket | 195 - 211 | 206 | Pass |
| P | Foot Length | 216 - 232 | 219 | Pass |
| Q | Hip Breadth (w/ pelvic plugs) | 313 - 323 | 316 | Pass |
| R | Arm Length | 249 - 259 | 250 | Pass |
| S | Knee Joint to Seatback | 477 - 493 | 481 | Pass |
| V | Shoulder Width | 341 - 357 | 346 | Pass |
| W | Foot Width | 78 - 94 | 85 | Pass |
| Y | Chest Circumference w/ jacket | 851 - 881 | 870 | Pass |
| Z | Waist Circumference | 761 - 791 | 772 | Pass |

**MGA RESEARCH CORPORATION
HEAD DROP TEST
SID-IIs BUILD LEVEL D DUMMY**

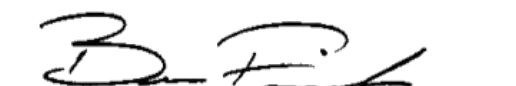
ATD Serial No: 296

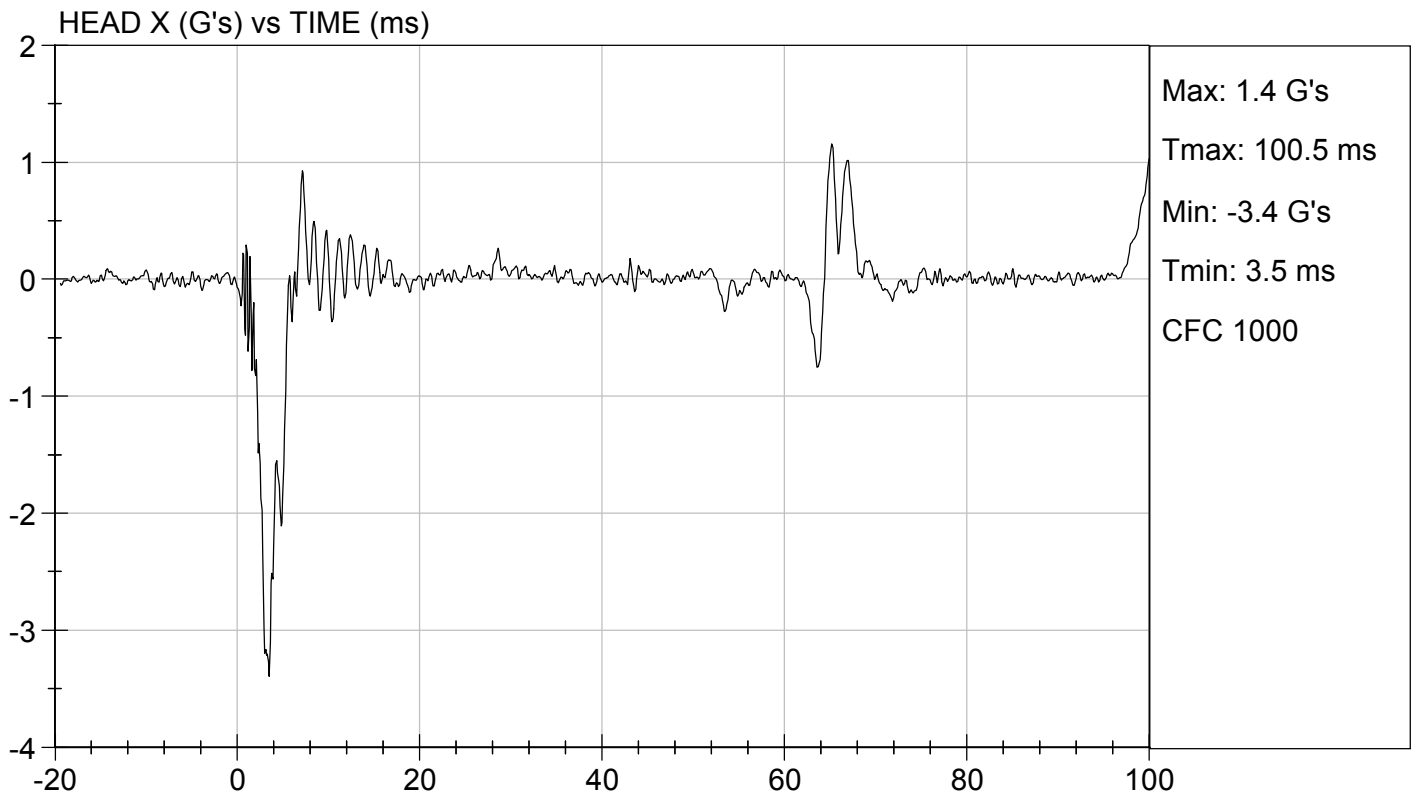
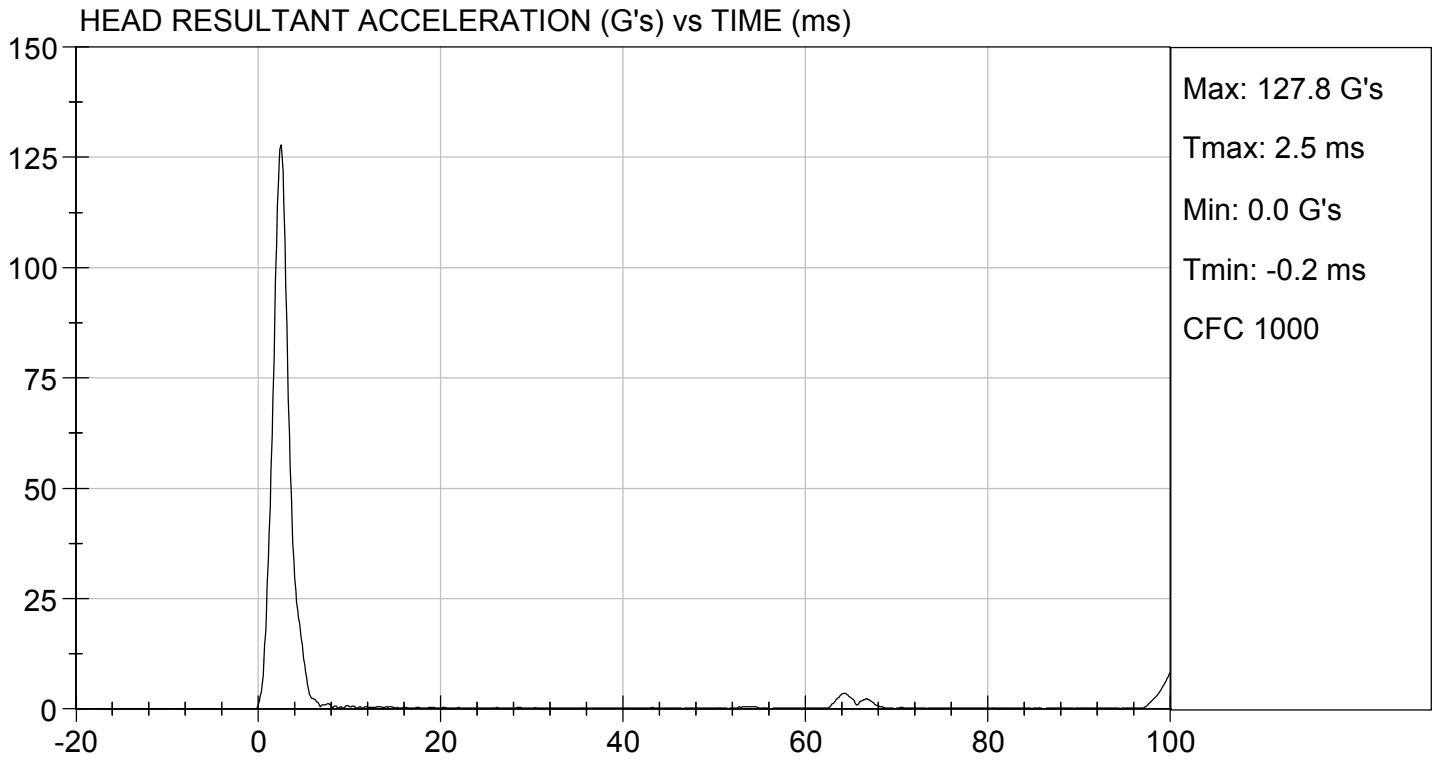
Test ID: D173061

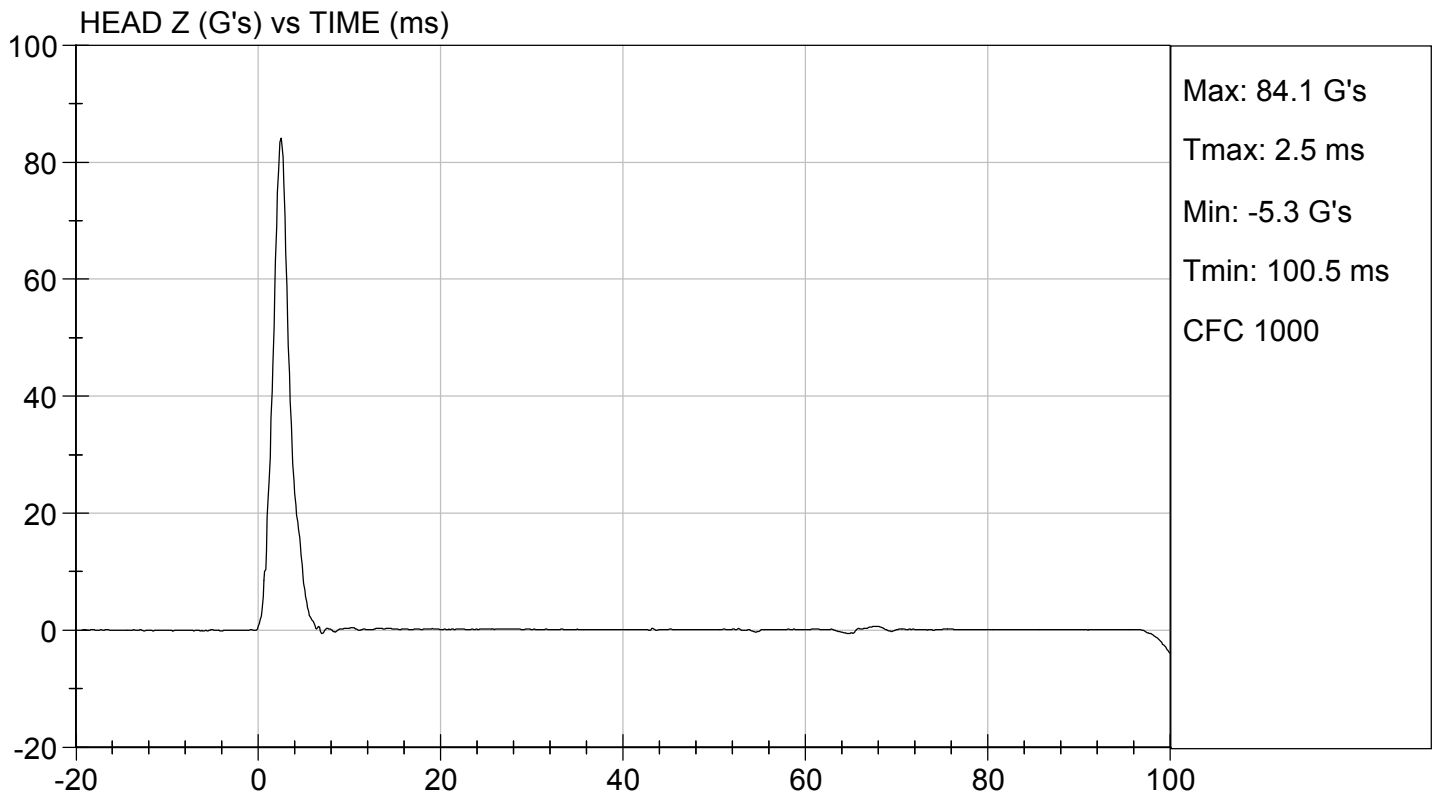
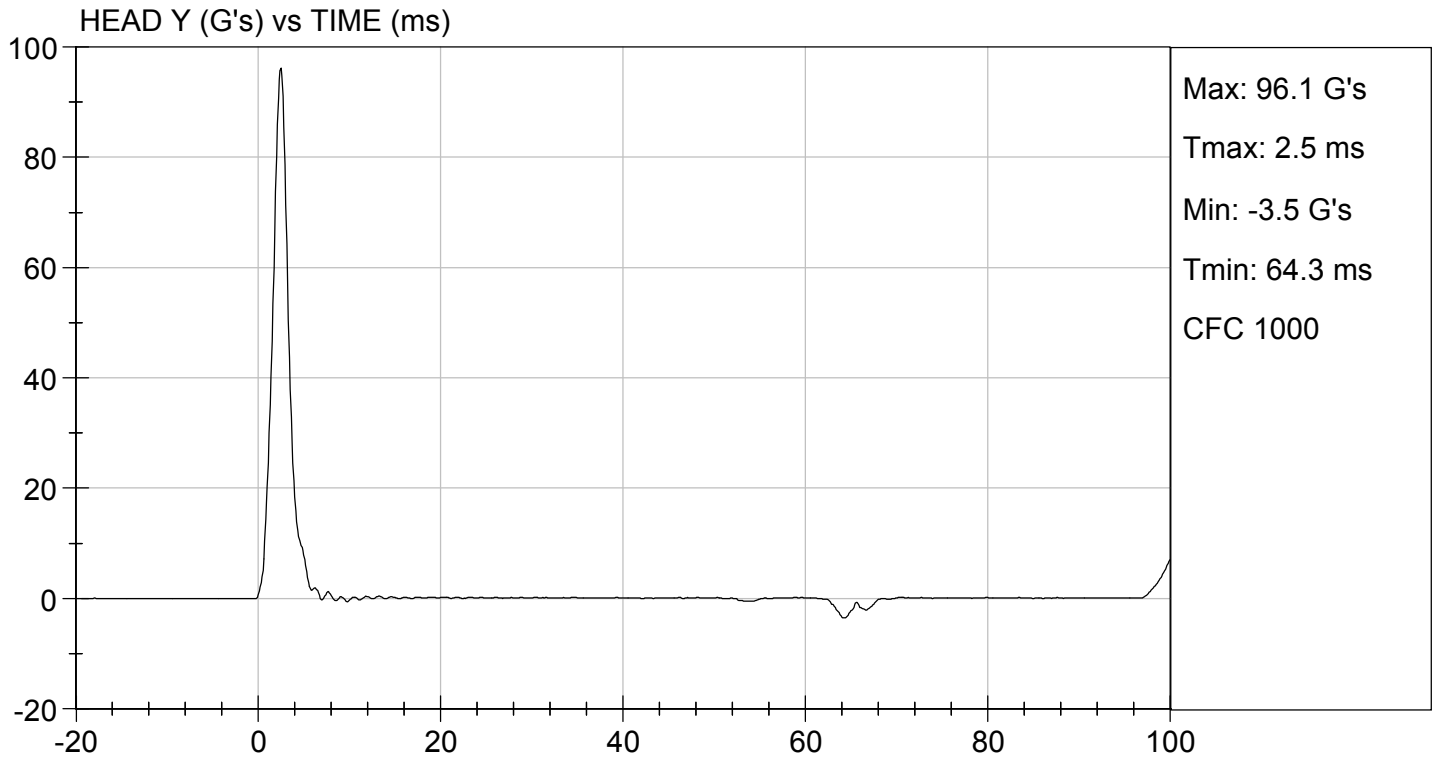
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|--------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 22.1 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 39 | Pass |
| Peak Resultant Acceleration | G's | 115 to 137 | 128 | Pass |
| Peak Longitudinal Acceleration | G's | +/- 15 | -3.4 | Pass |
| Unimodal | N/A | Yes | Yes | Pass |
| Oscillations | N/A | <15% | Yes | Pass |
| Overall Test Results | | | | Pass |


Laboratory Technician

10/23/2017
Test Date


Approved By





**MGA RESEARCH CORPORATION
LATERAL NECK PENDULUM TEST
SID-IIs BUILD LEVEL D DUMMY**

ATD Serial No: 296

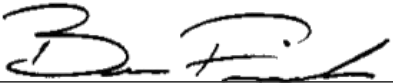
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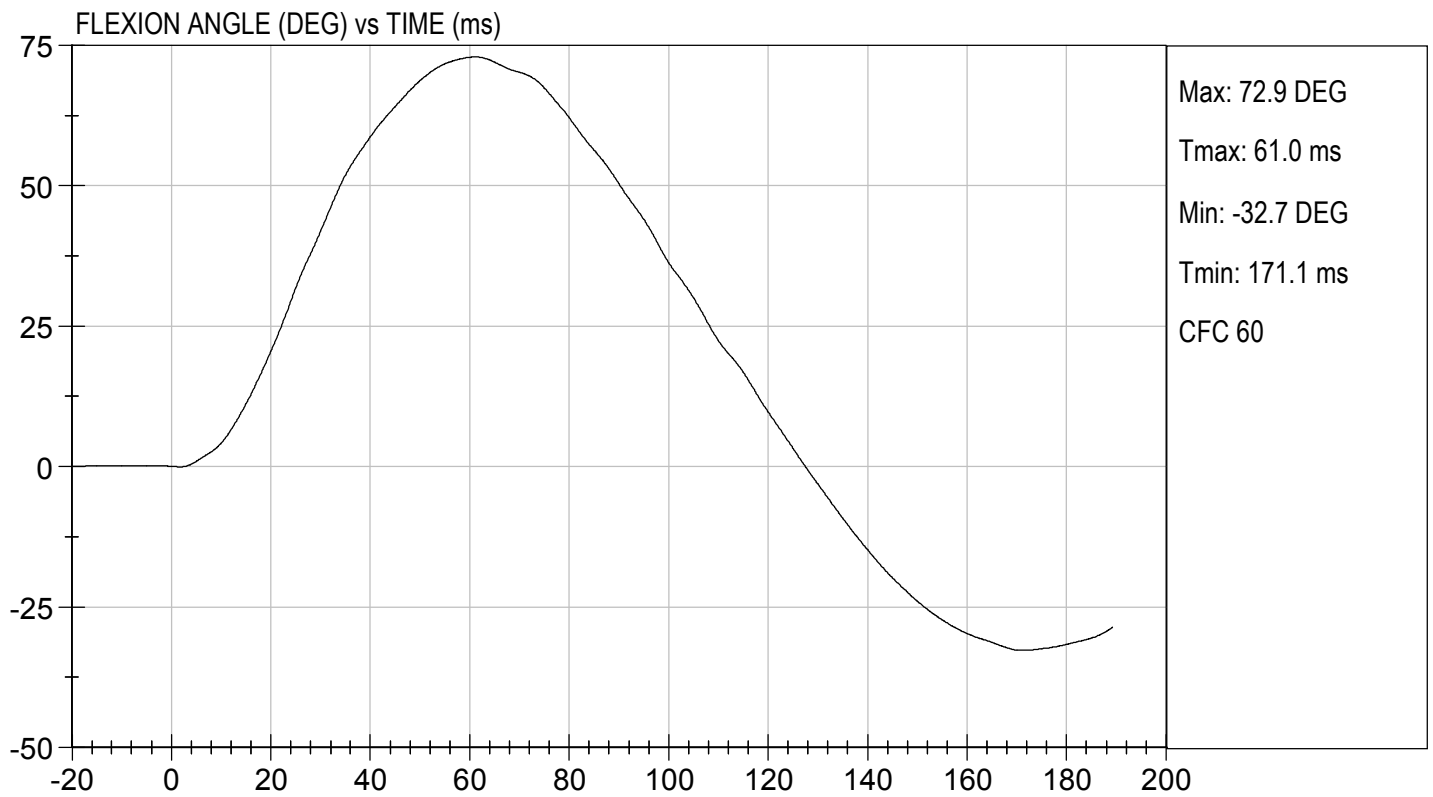
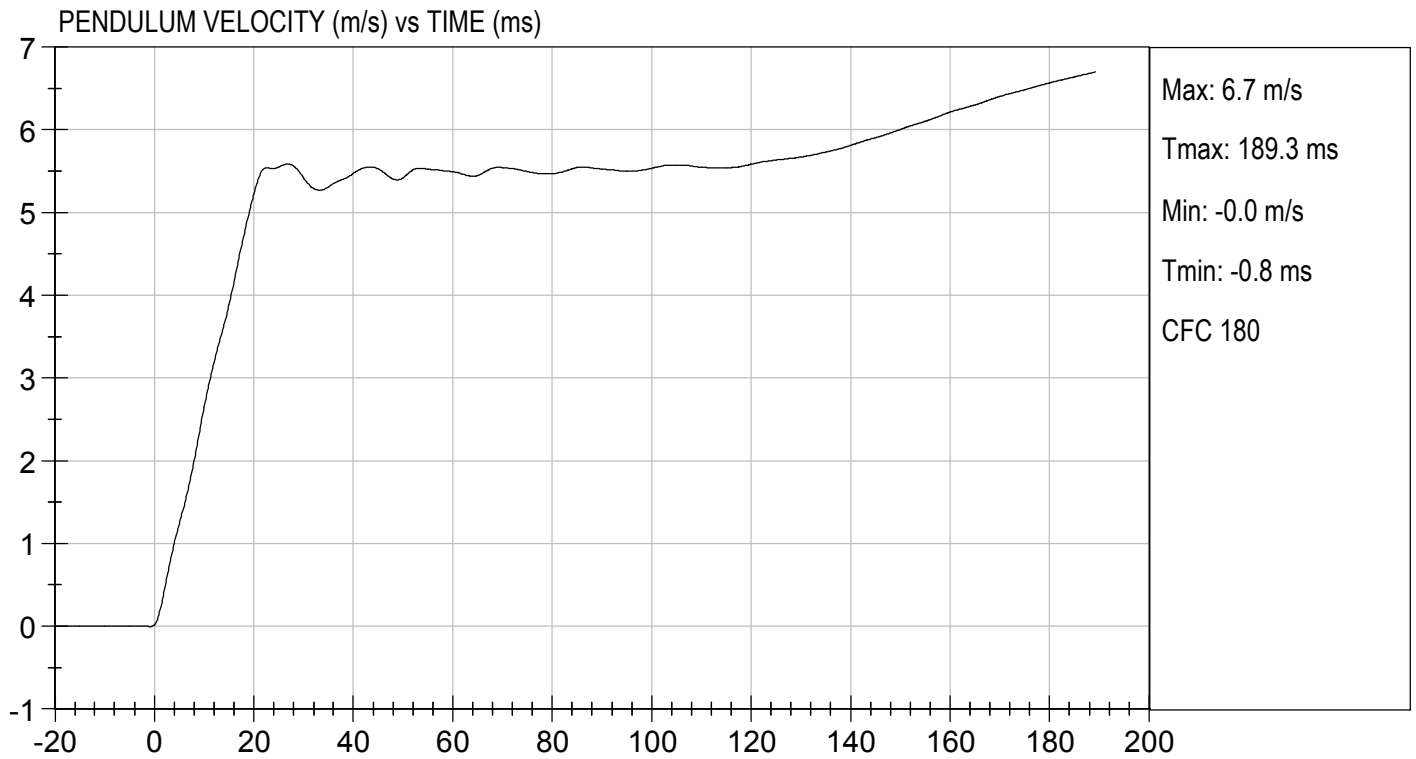
| Tested Parameter | Units | Specification | Result | Pass/Fail | |
|----------------------------------|-----------|---------------|--------------|-------------|------|
| Temperature | deg C | 20.6 to 22.2 | 21.7 | Pass | |
| Humidity | % | 10 to 70 | 42 | Pass | |
| Impact Velocity | m/s | 5.51 to 5.63 | 5.58 | Pass | |
| Pendulum Velocity | 10 ms | m/s | 2.20 to 2.80 | 2.65 | Pass |
| | 15 ms | m/s | 3.30 to 4.10 | 3.88 | Pass |
| | 20 ms | m/s | 4.40 to 5.40 | 5.22 | Pass |
| | 25 ms | m/s | 5.40 to 6.10 | 5.55 | Pass |
| | 25-100 ms | m/s | 5.50 to 6.20 | 5.58 | Pass |
| Maximum D-Plane Rotation | deg | 71 to 81 | 73 | Pass | |
| Time of Maximum D-Plane Rotation | ms | 50 to 70 | 61 | Pass | |
| Maximum Occipital Condyle Moment | Nm | -44 to -36 | -43 | Pass | |
| Time of Moment Decay to 0 Nm | ms | 102 to 126 | 113 | Pass | |
| Overall Test Results | | | | Pass | |

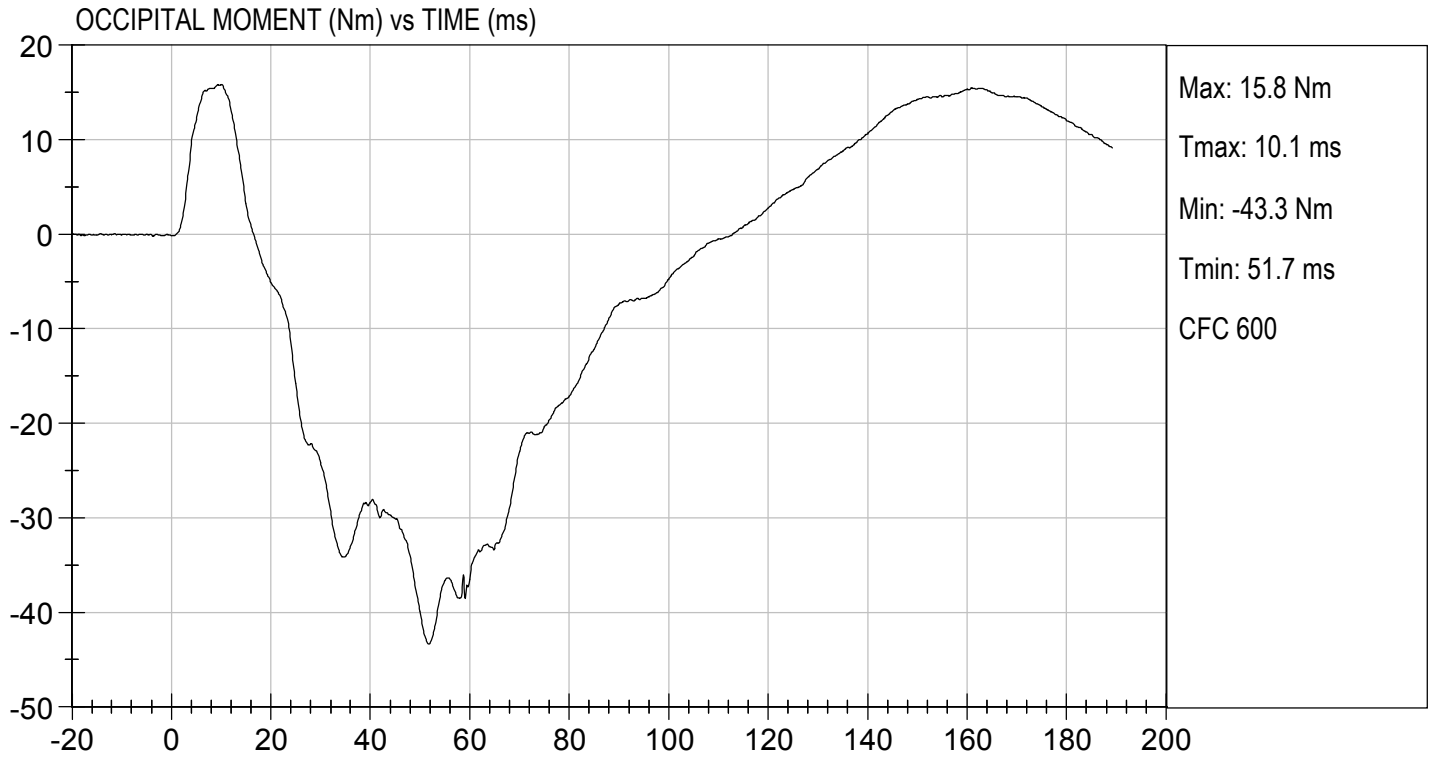

Laboratory Technician

10/23/2017

Test Date


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MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

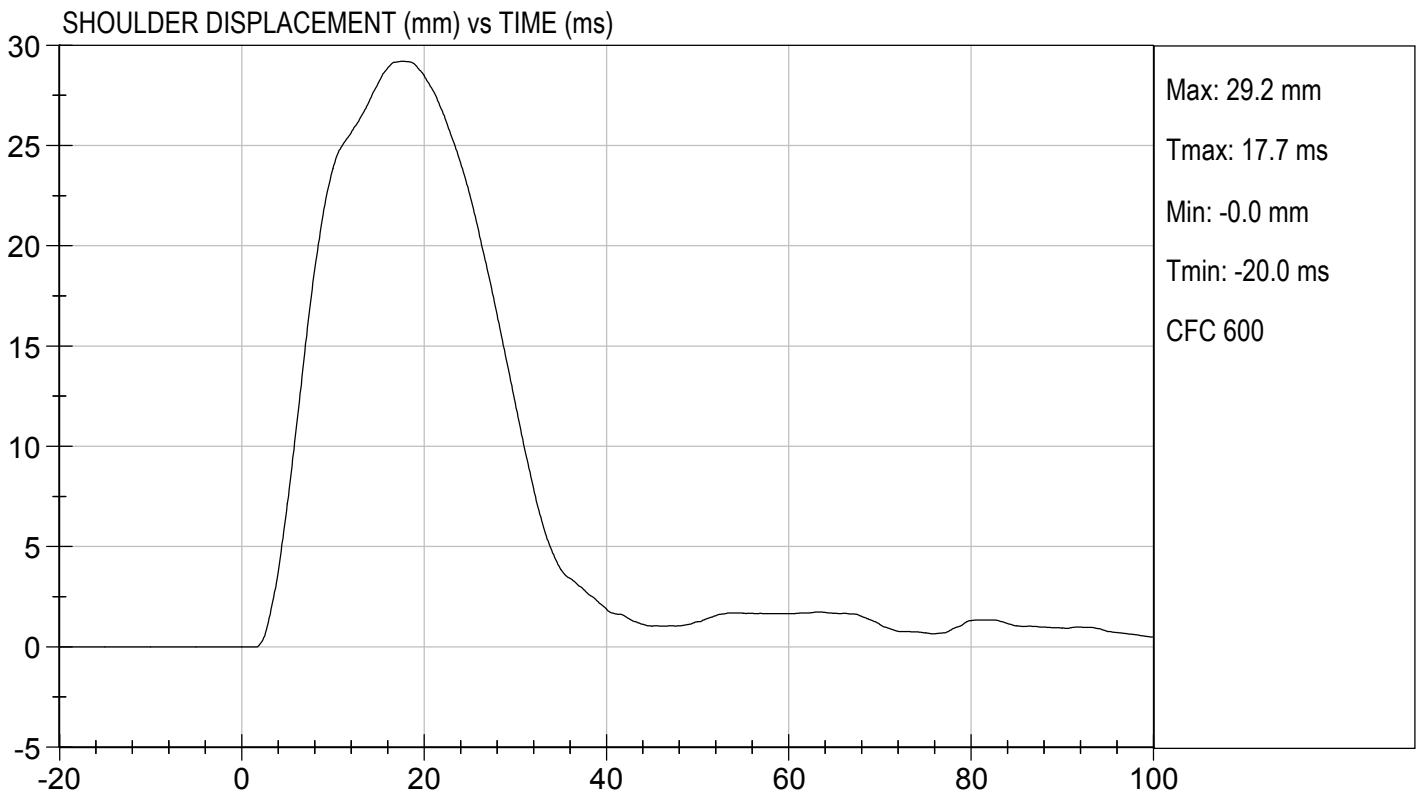
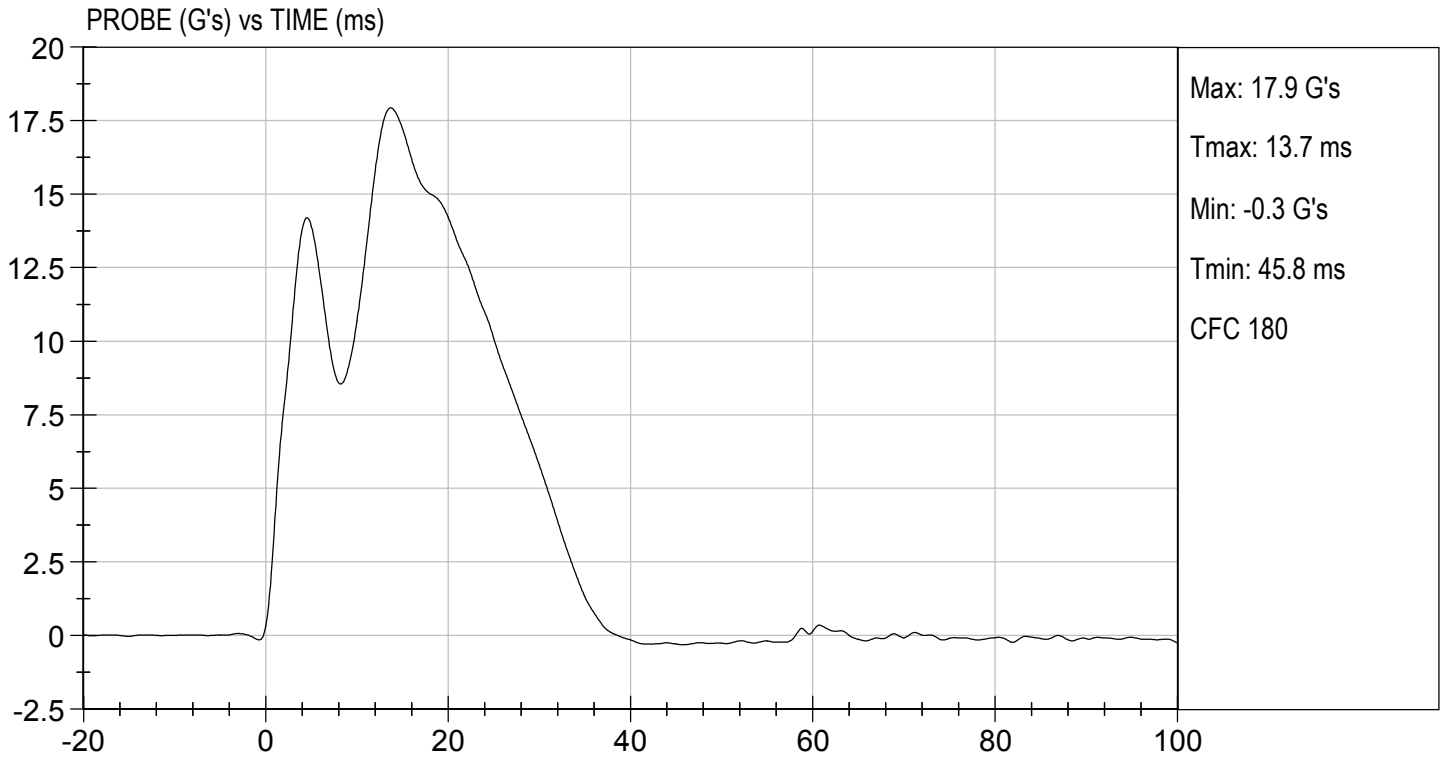
Test ID: D173063

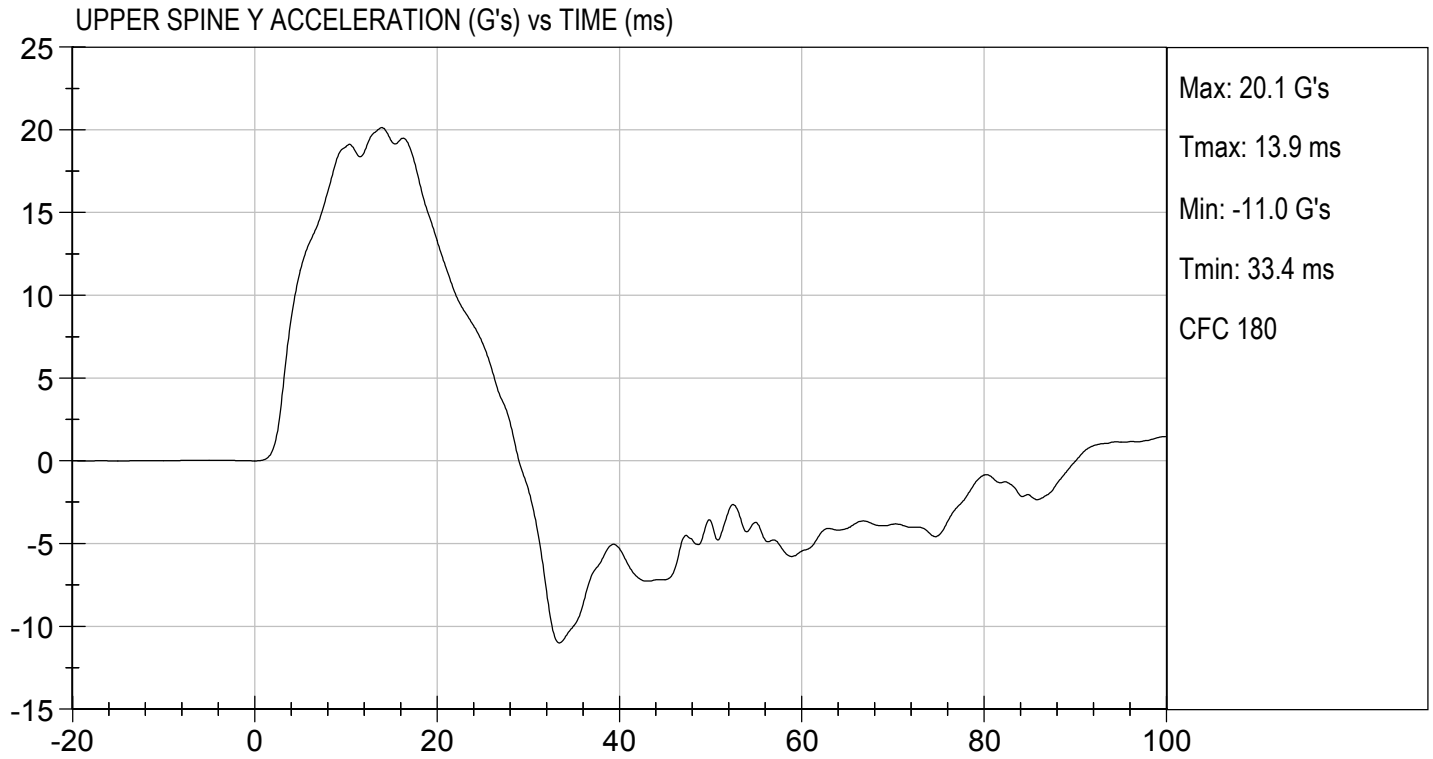
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|---------------------------------|-------|---------------|--------|-----------|
| Laboratory Temperature | deg C | 20.6 to 22.2 | 21.2 | Pass |
| Laboratory Relative Humidity | % | 10 to 70 | 43 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.27 | Pass |
| Maximum Probe Acceleration | G's | 13 to 18 | 18 | Pass |
| Shoulder Displacement | mm | 28 to 37 | 29 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 17 to 22 | 20 | Pass |
| Overall Test Results | | | | Pass |

Danielle Redinlaugh
 Laboratory Technician

10/23/2017
 Test Date

B. F.
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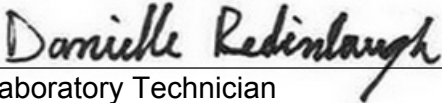


MGA RESEARCH CORPORATION
THORAX (WITH ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

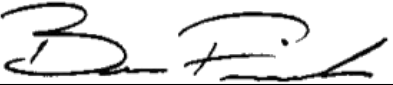
ATD Serial No: 296

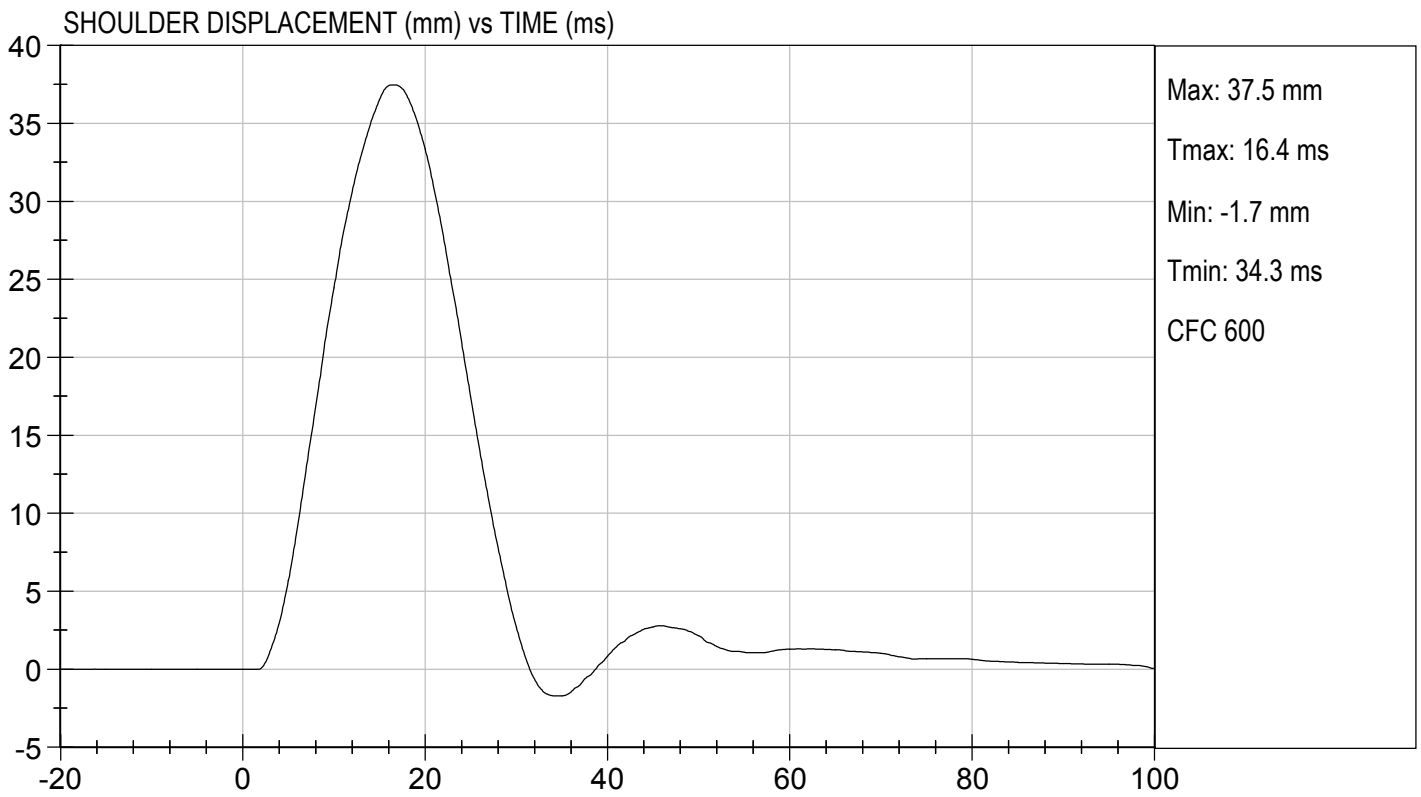
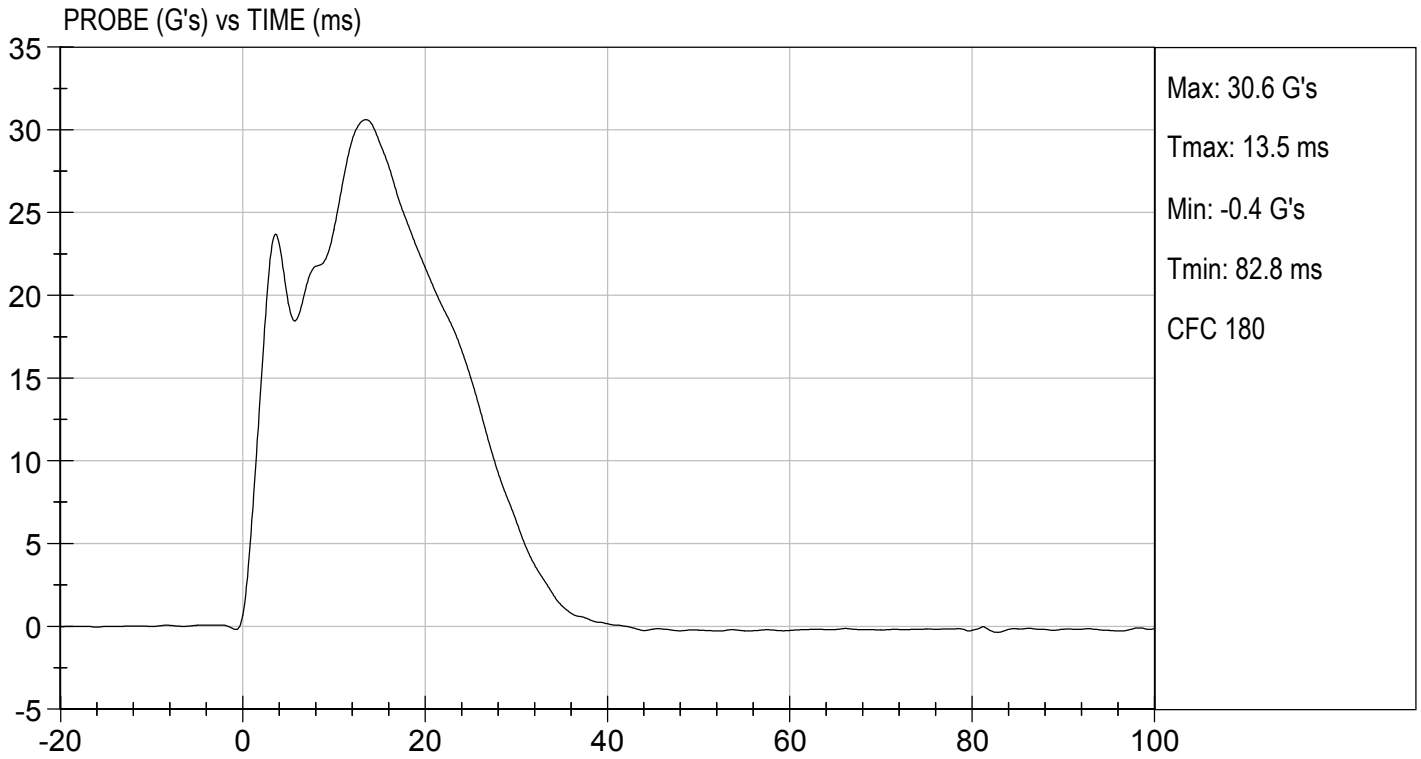
Test I.D: D173064

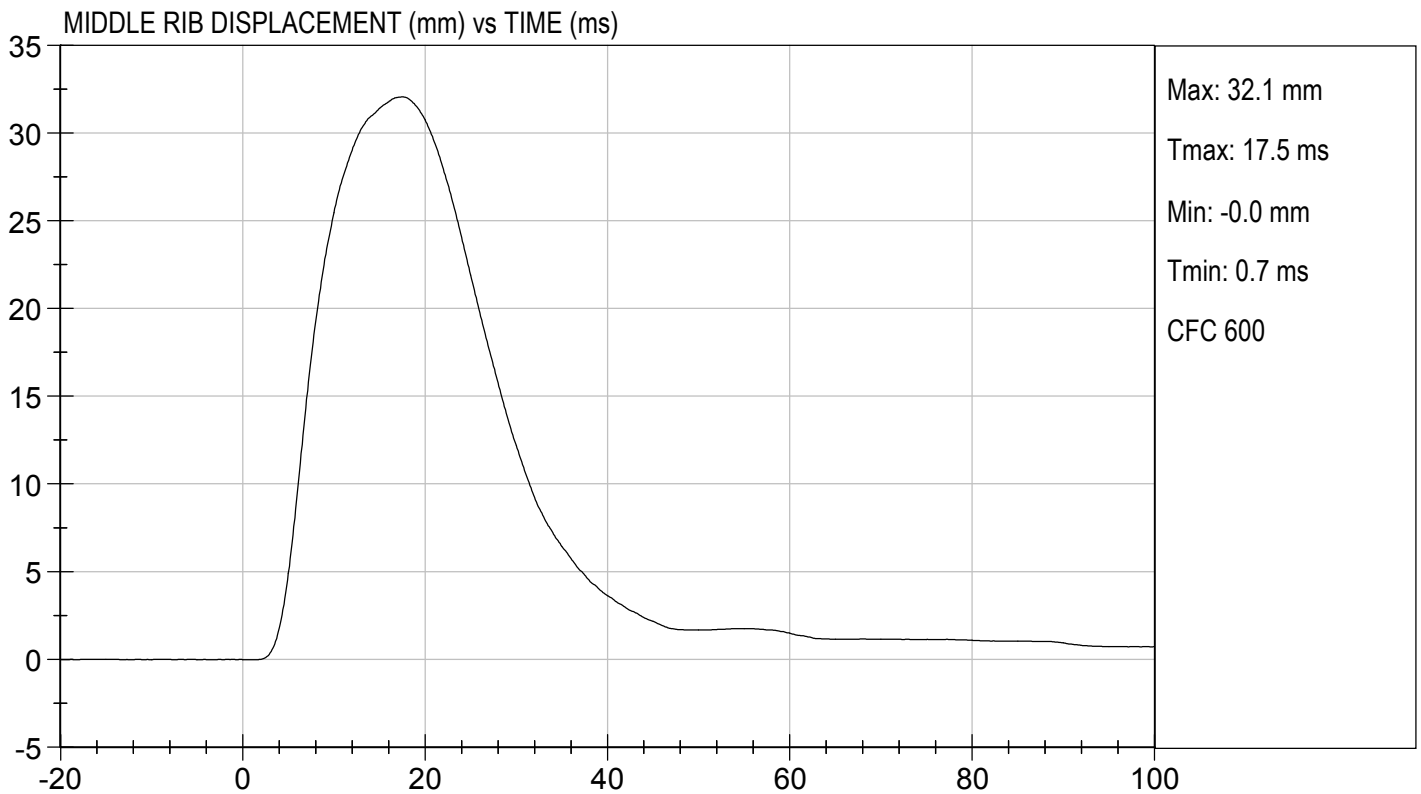
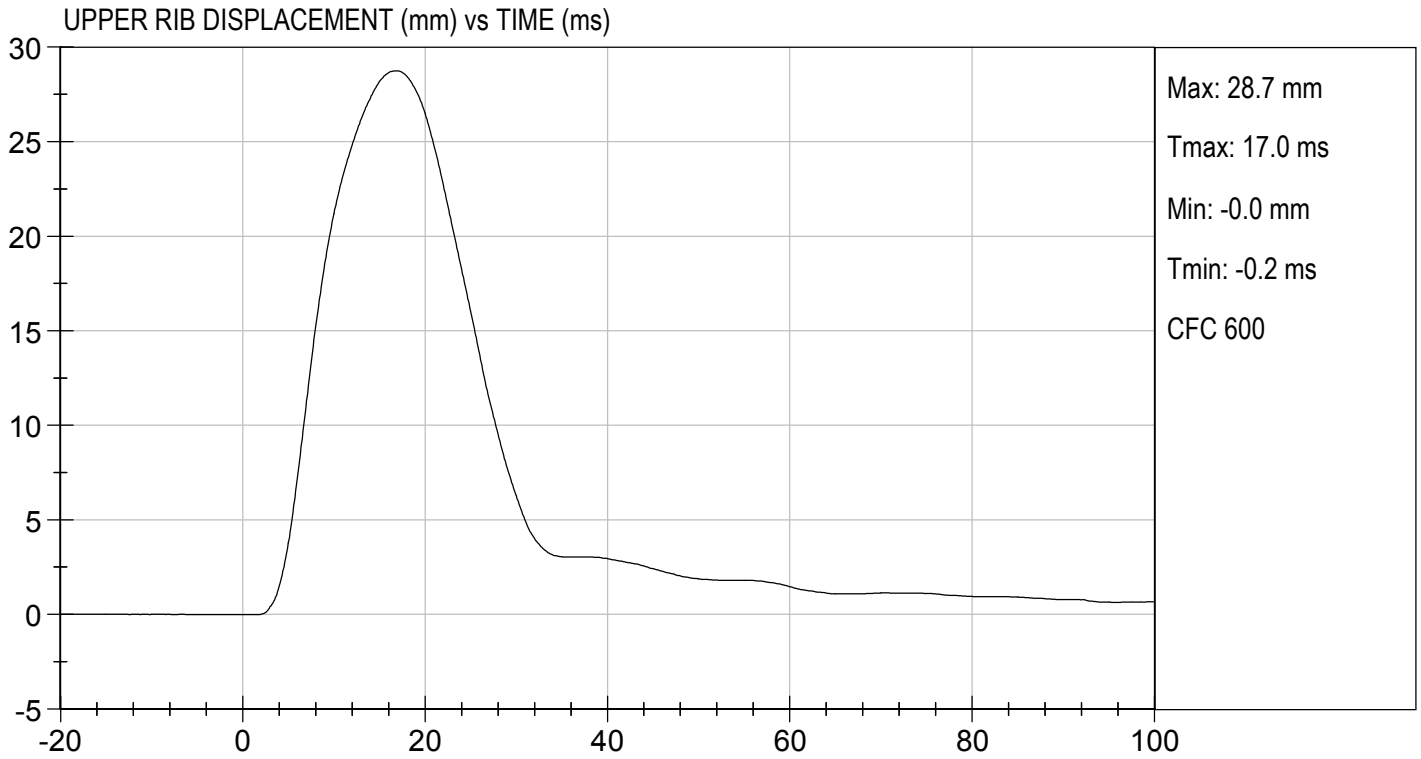
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.2 | Pass |
| Humidity | % | 10 to 70 | 43 | Pass |
| Impact Velocity | m/s | 6.60 to 6.80 | 6.77 | Pass |
| Maximum Probe Acceleration | G's | 30 to 36 | 31 | Pass |
| Shoulder Displacement | mm | 31 to 40 | 37 | Pass |
| Upper Rib Displacement | mm | 25 to 32 | 29 | Pass |
| Middle Rib Displacement | mm | 30 to 36 | 32 | Pass |
| Lower Rib Displacement | mm | 32 to 38 | 34 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 34 to 43 | 35 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 29 to 37 | 31 | Pass |
| Overall Test Results | | | | Pass |

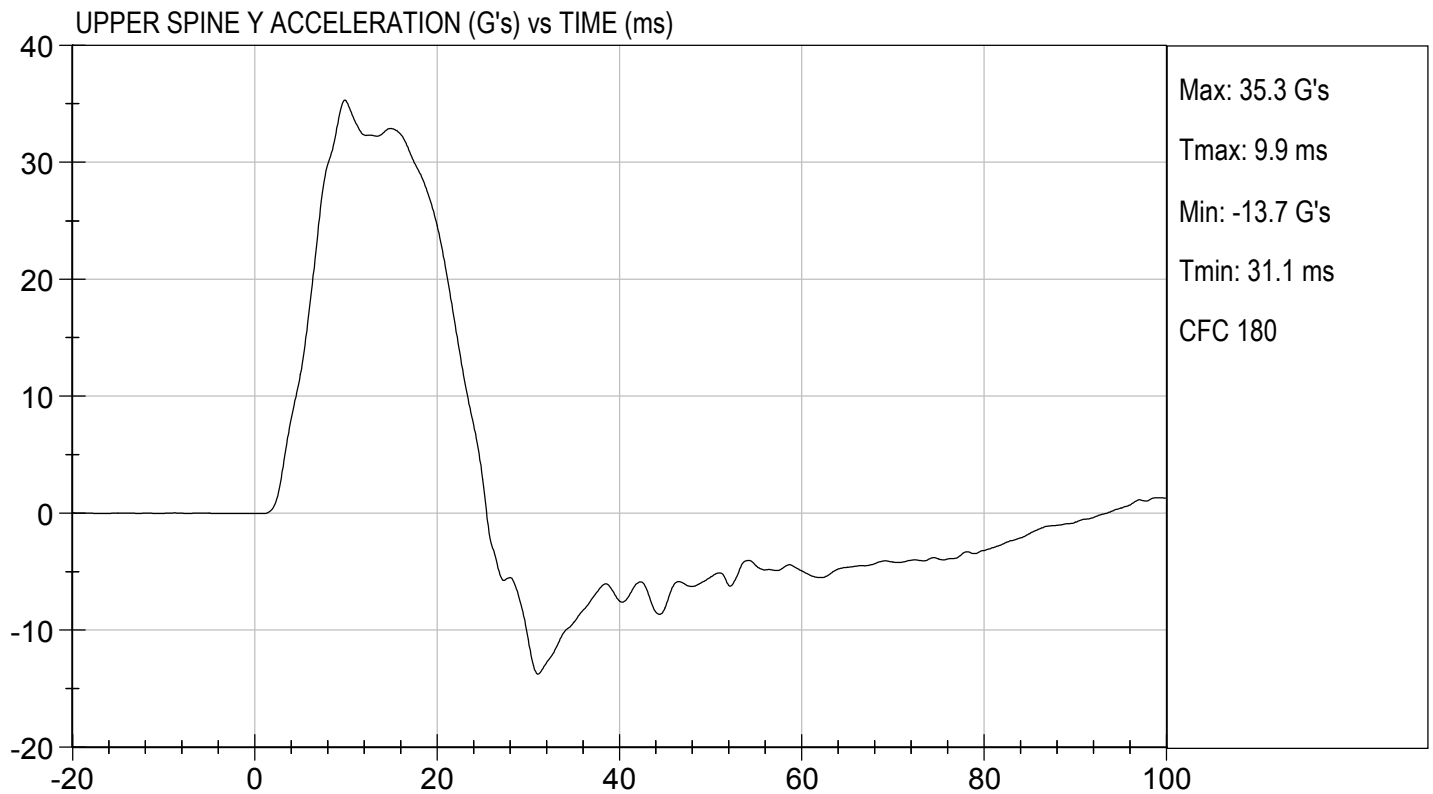
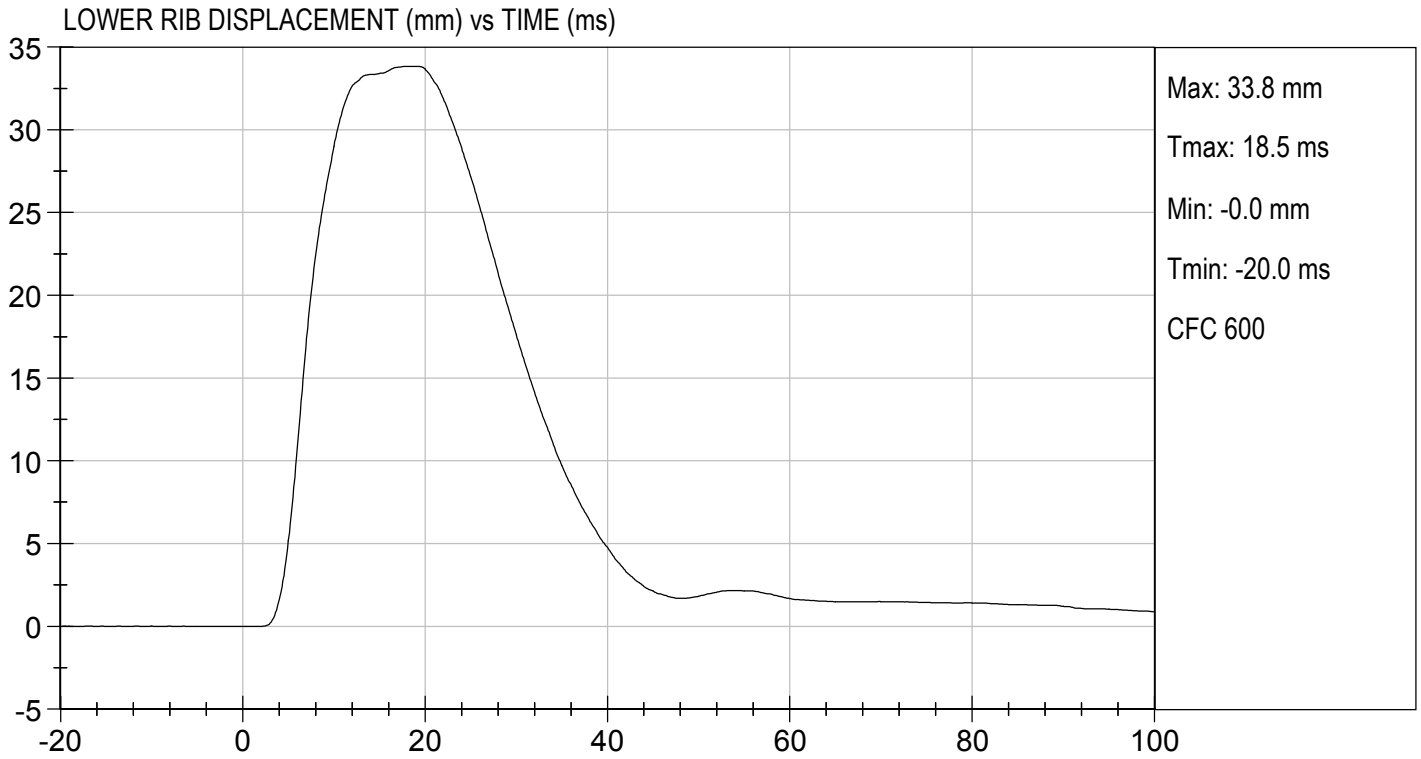

 Laboratory Technician

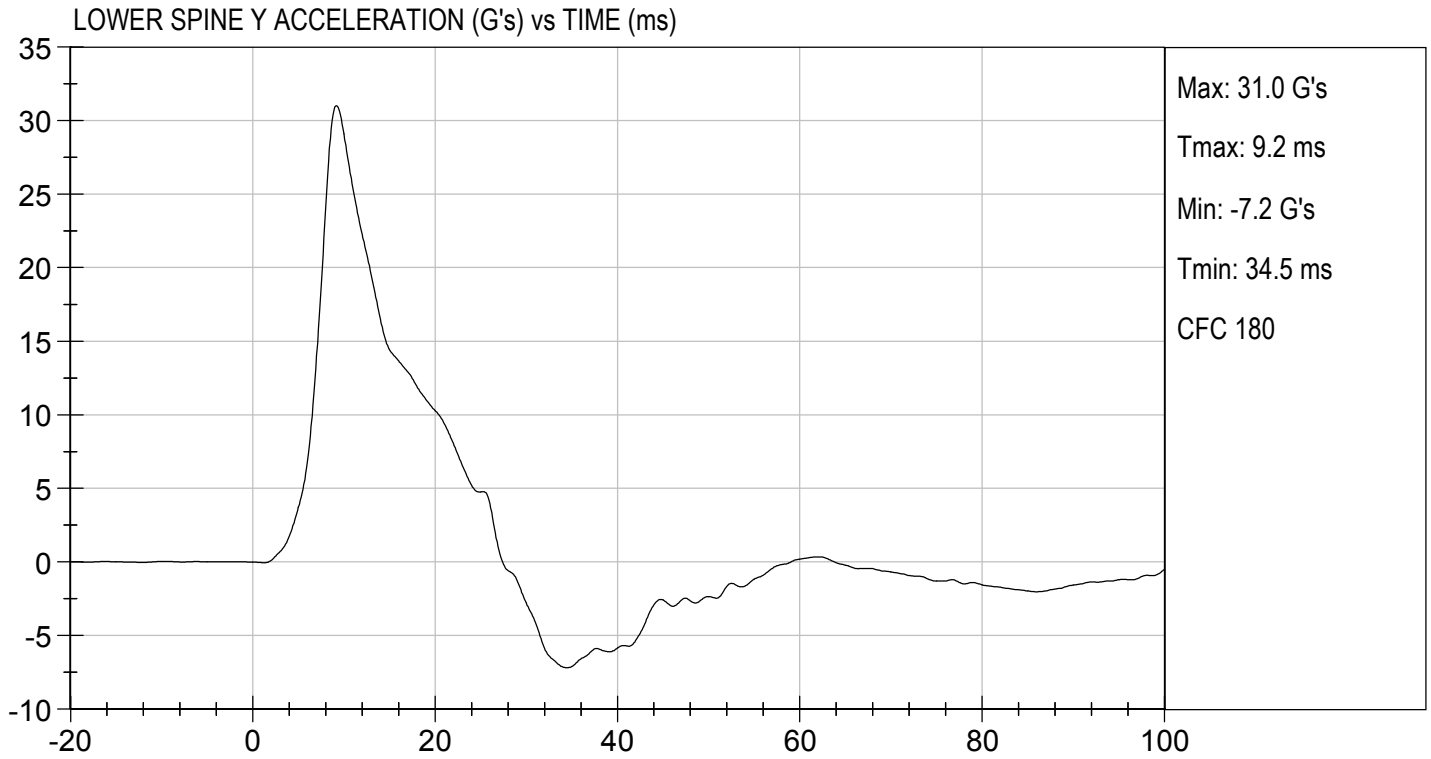
10/23/2017
 Test Date


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MGA RESEARCH CORPORATION
THORAX (WITHOUT ARM) IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

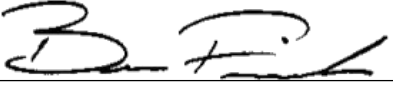
ATD Serial No: 296

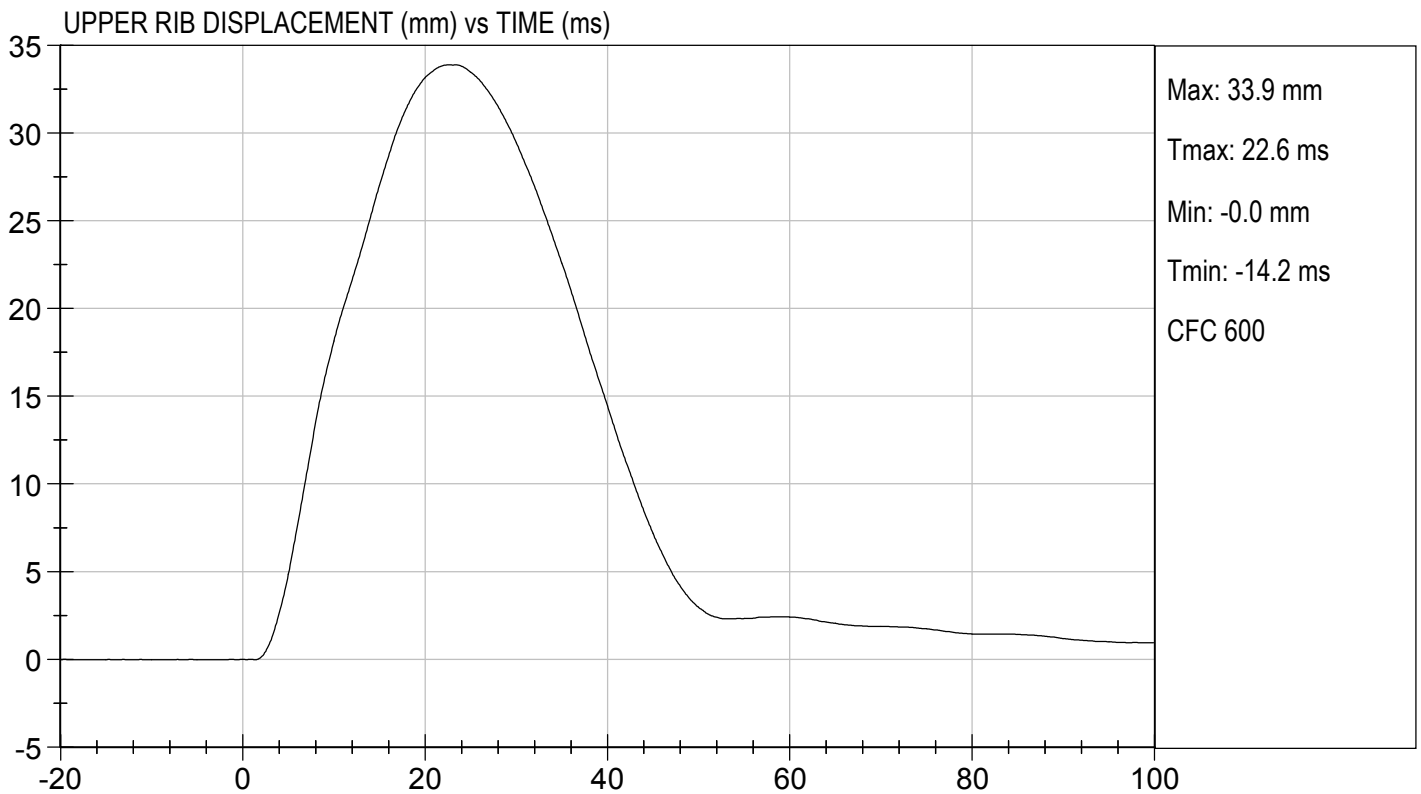
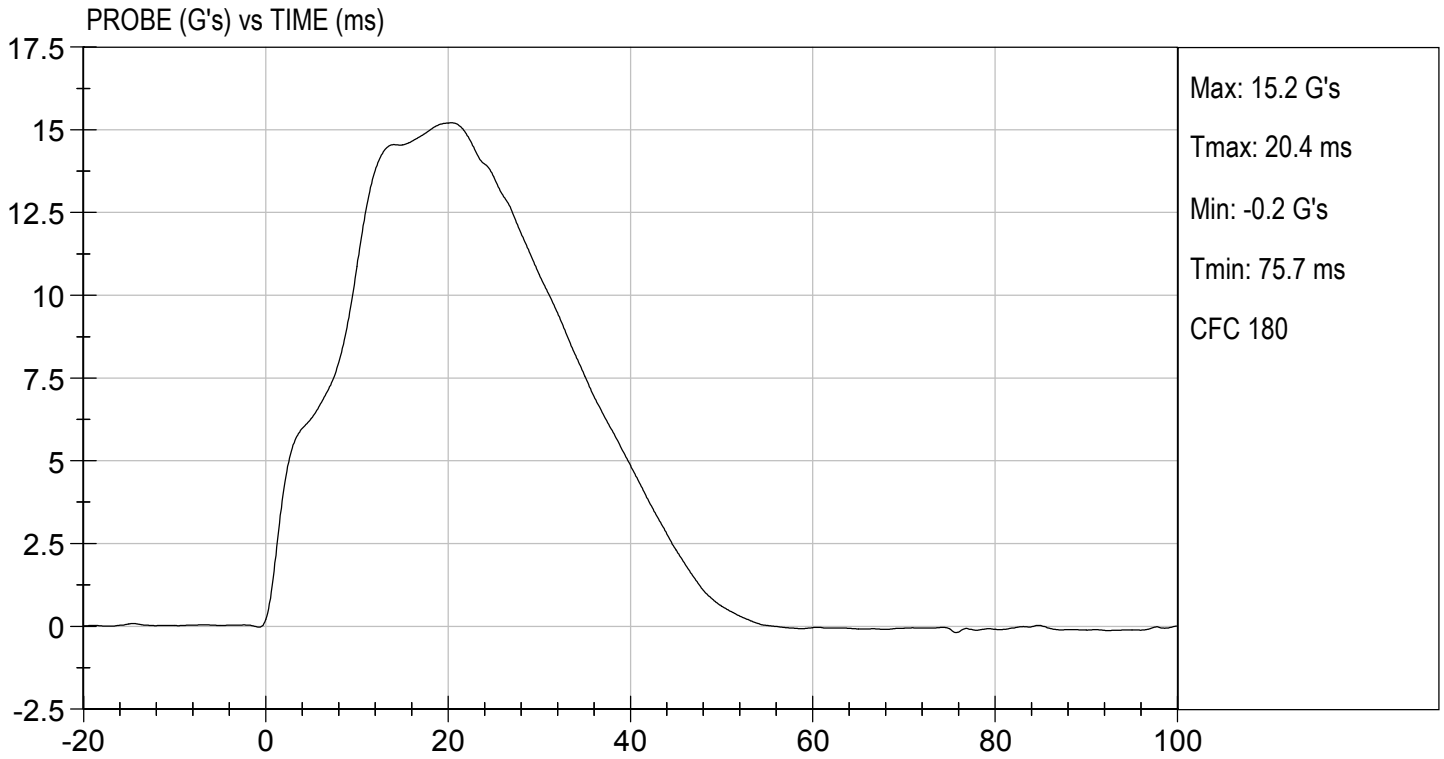
Test I.D: D173065

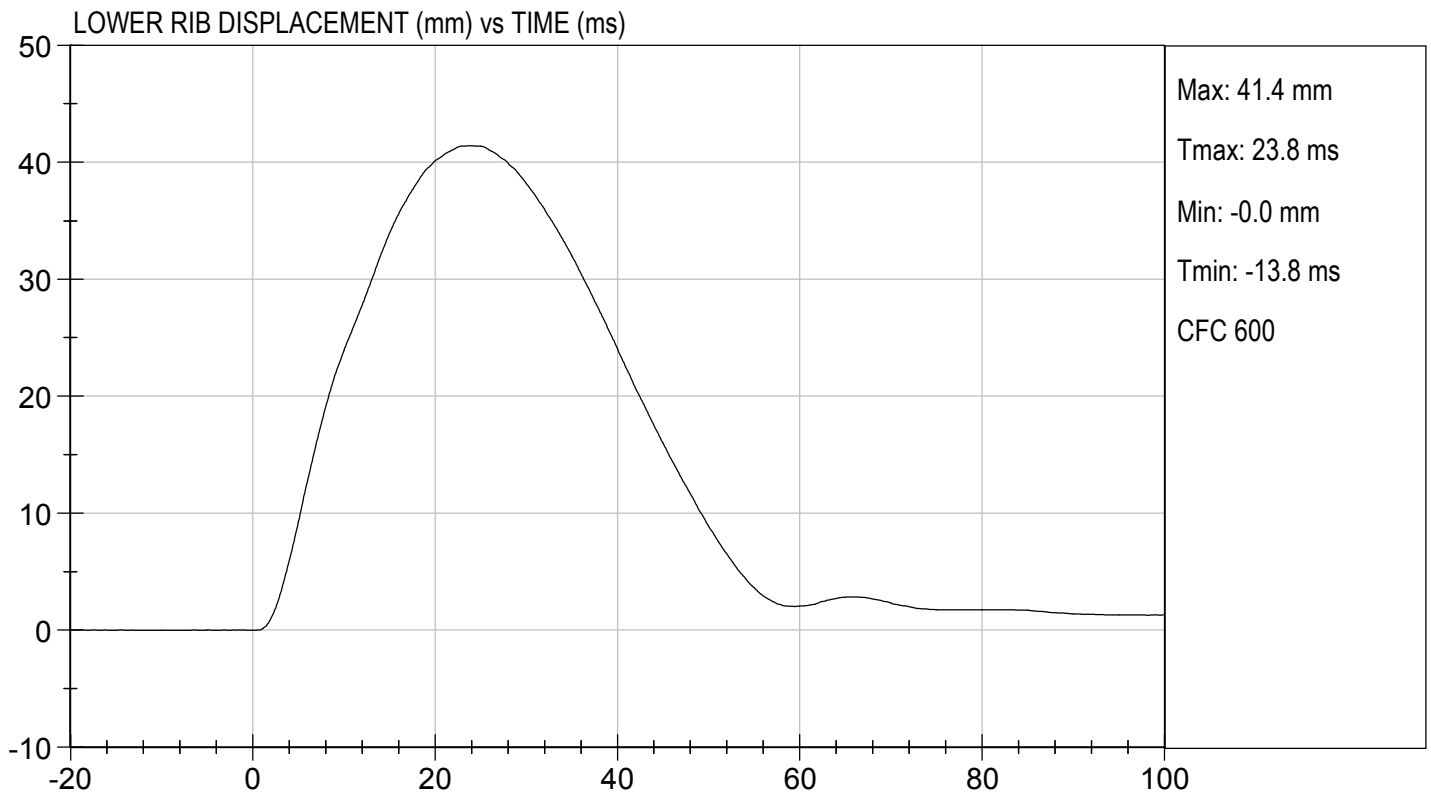
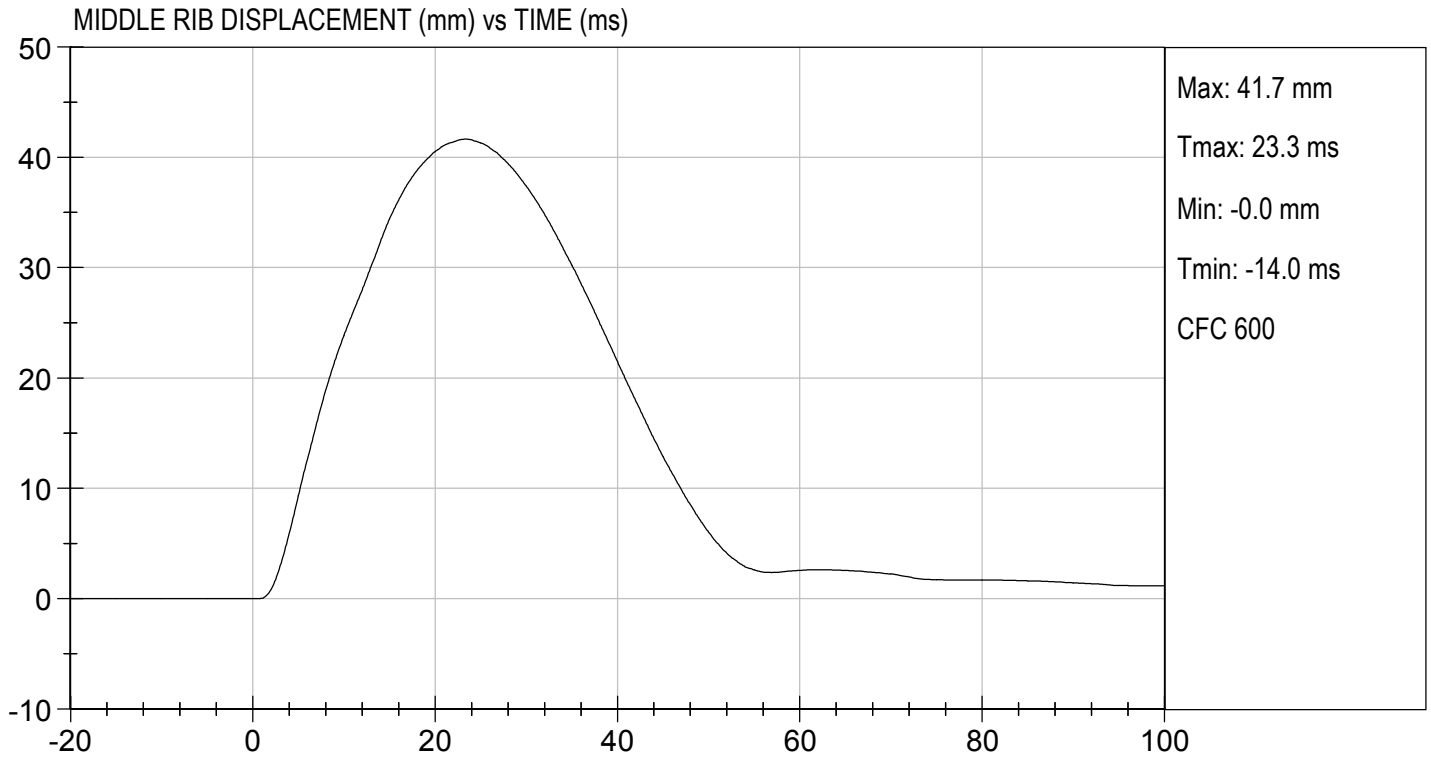
| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.2 | Pass |
| Humidity | % | 10 to 70 | 43 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.30 | Pass |
| Maximum Probe Acceleration | G's | 14 to 18 | 15 | Pass |
| Upper Rib Displacement | mm | 32 to 40 | 34 | Pass |
| Middle Rib Displacement | mm | 39 to 45 | 42 | Pass |
| Lower Rib Displacement | mm | 35 to 43 | 41 | Pass |
| Upper Spine (T1) Y Acceleration | G's | 13 to 17 | 15 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 7 to 11 | 9 | Pass |
| Overall Test Results | | | | Pass |

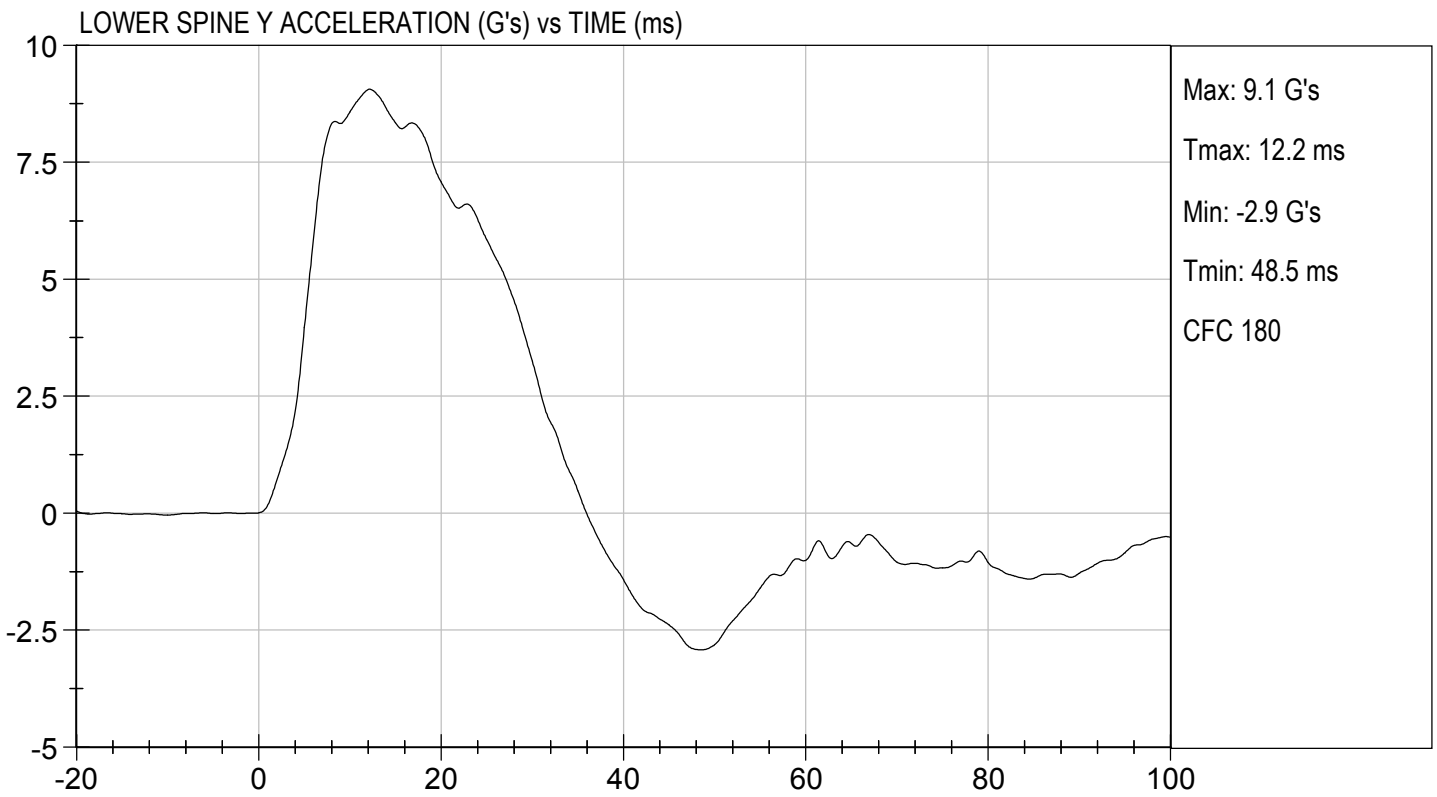
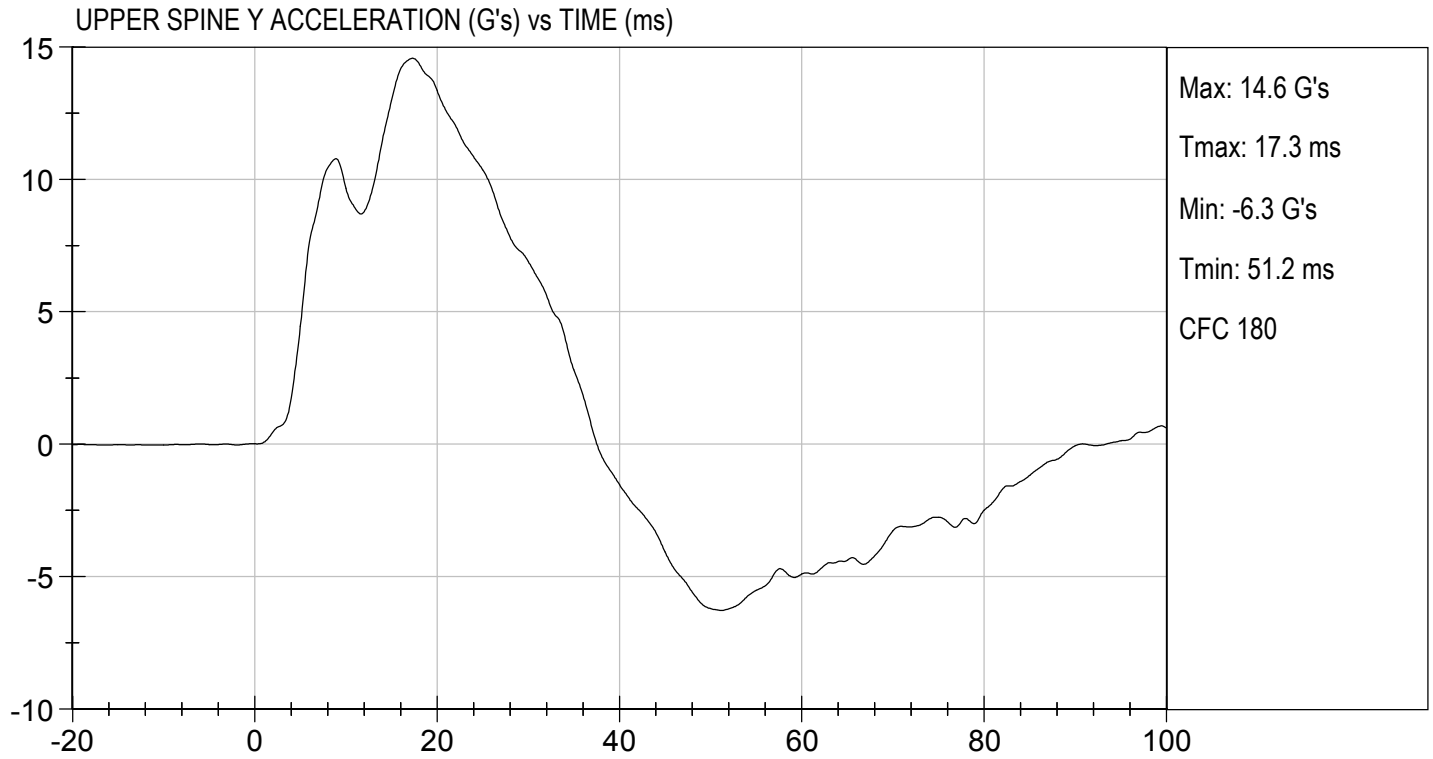

 Laboratory Technician

10/23/2017
 Test Date


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MGA RESEARCH CORPORATION
ABDOMINAL IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

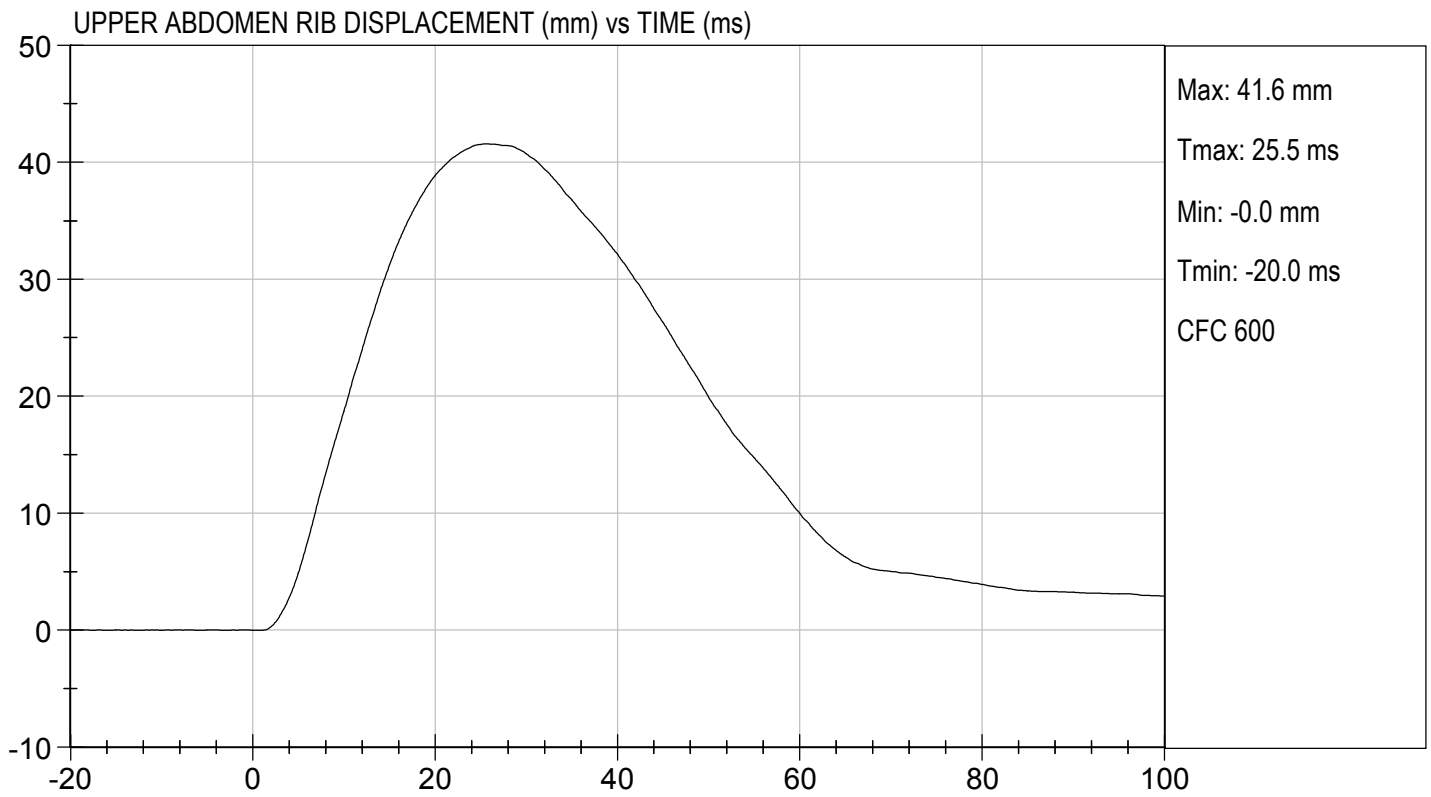
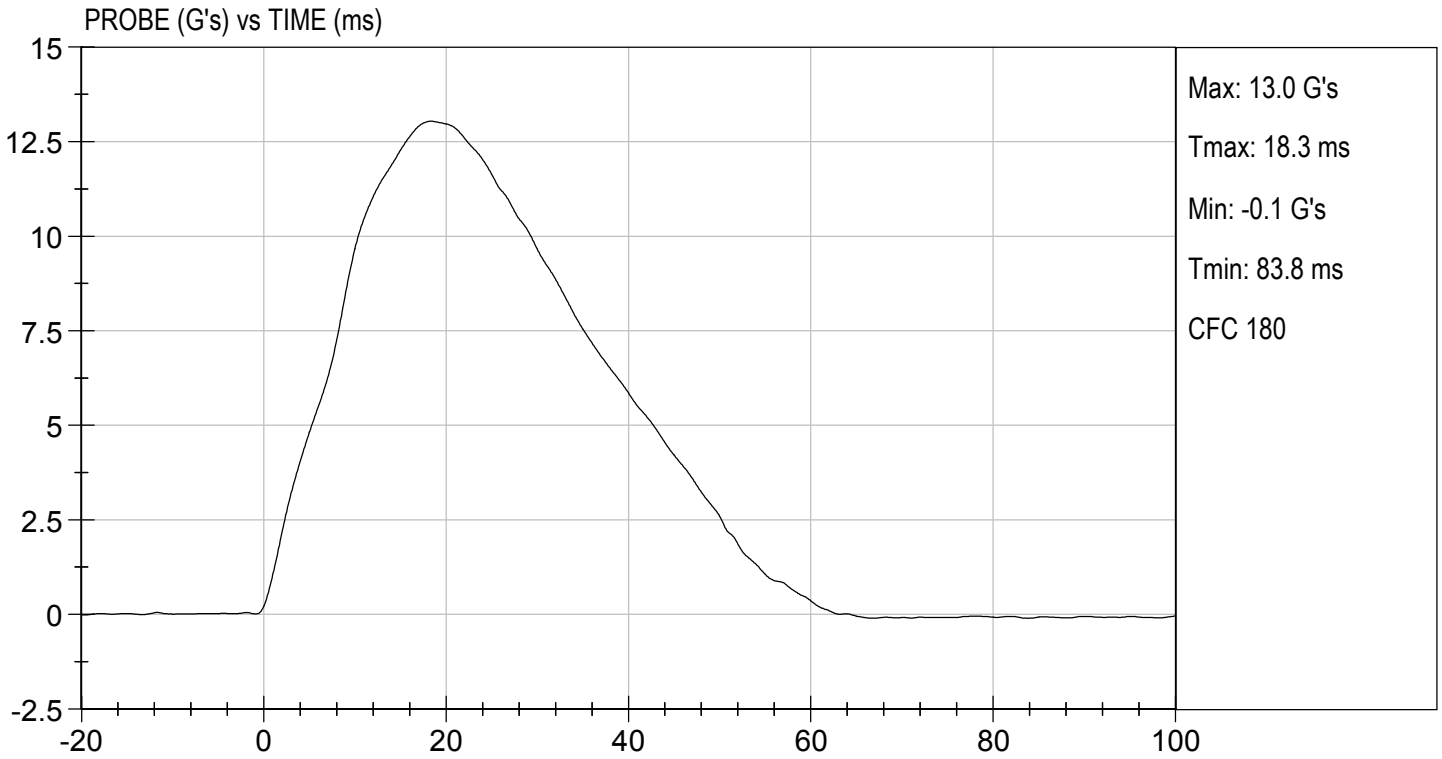
Test I.D: D173066

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.2 | Pass |
| Humidity | % | 10 to 70 | 43 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.27 | Pass |
| Maximum Probe Acceleration | G's | 12 to 16 | 13 | Pass |
| Upper Abdomen Rib Displacement | mm | 36 to 47 | 42 | Pass |
| Lower Abdomen Rib Displacement | mm | 33 to 44 | 41 | Pass |
| Lower Spine (T12) Y Acceleration | G's | 9 to 14 | 10 | Pass |
| Overall Test Results | | | | Pass |

Danielle Redinlaugh
 Laboratory Technician

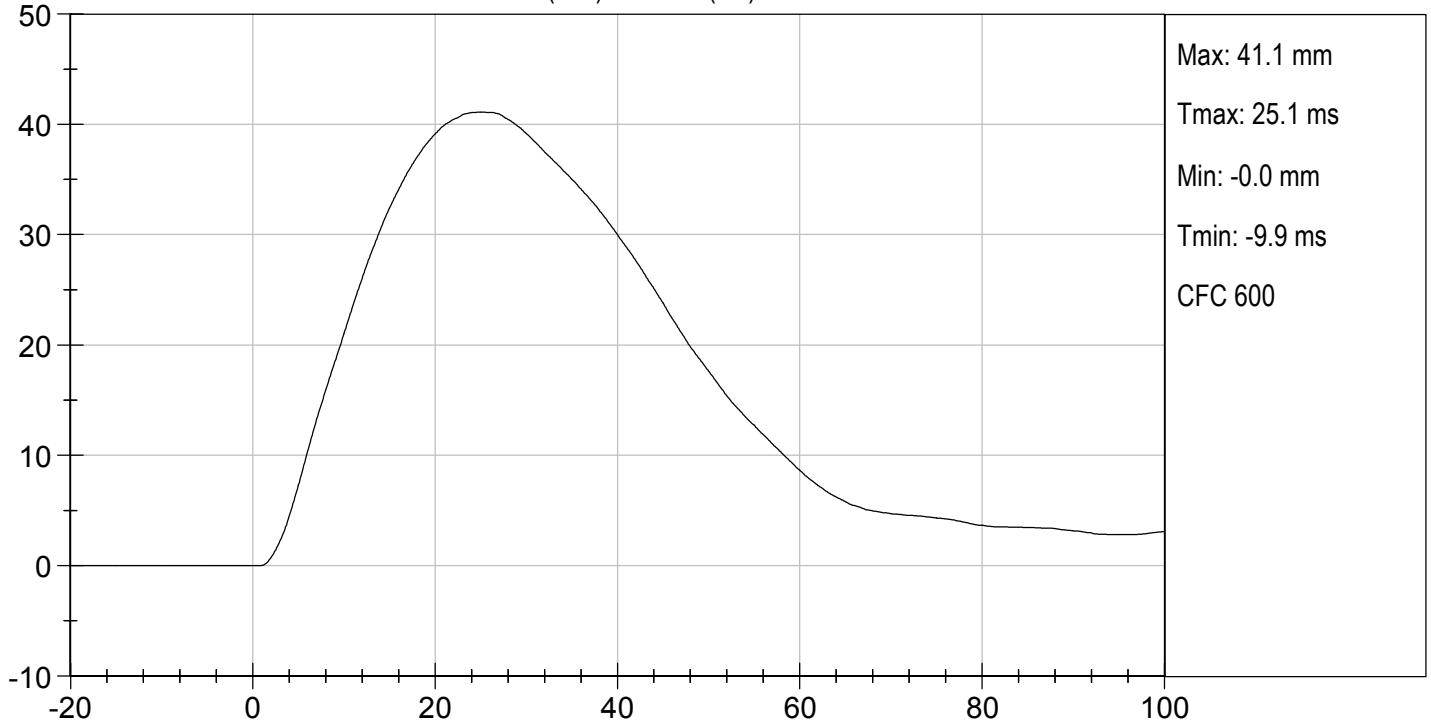
10/23/2017
 Test Date

B. F. K.
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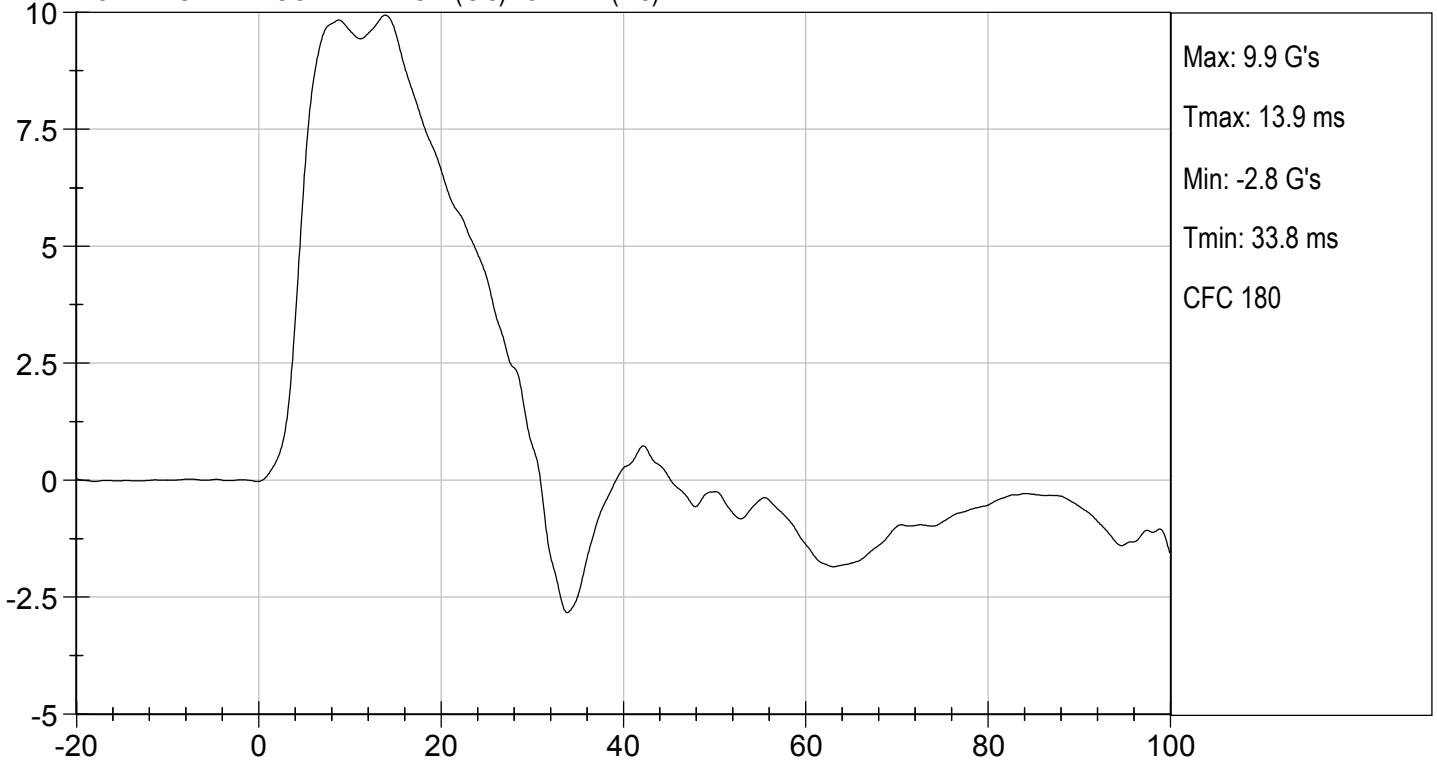




LOWER ABDOMEN RIB DISPLACEMENT (mm) vs TIME (ms)



LOWER SPINE ACCELERATION (G's) vs TIME (ms)



MGA RESEARCH CORPORATION
PELVIS IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

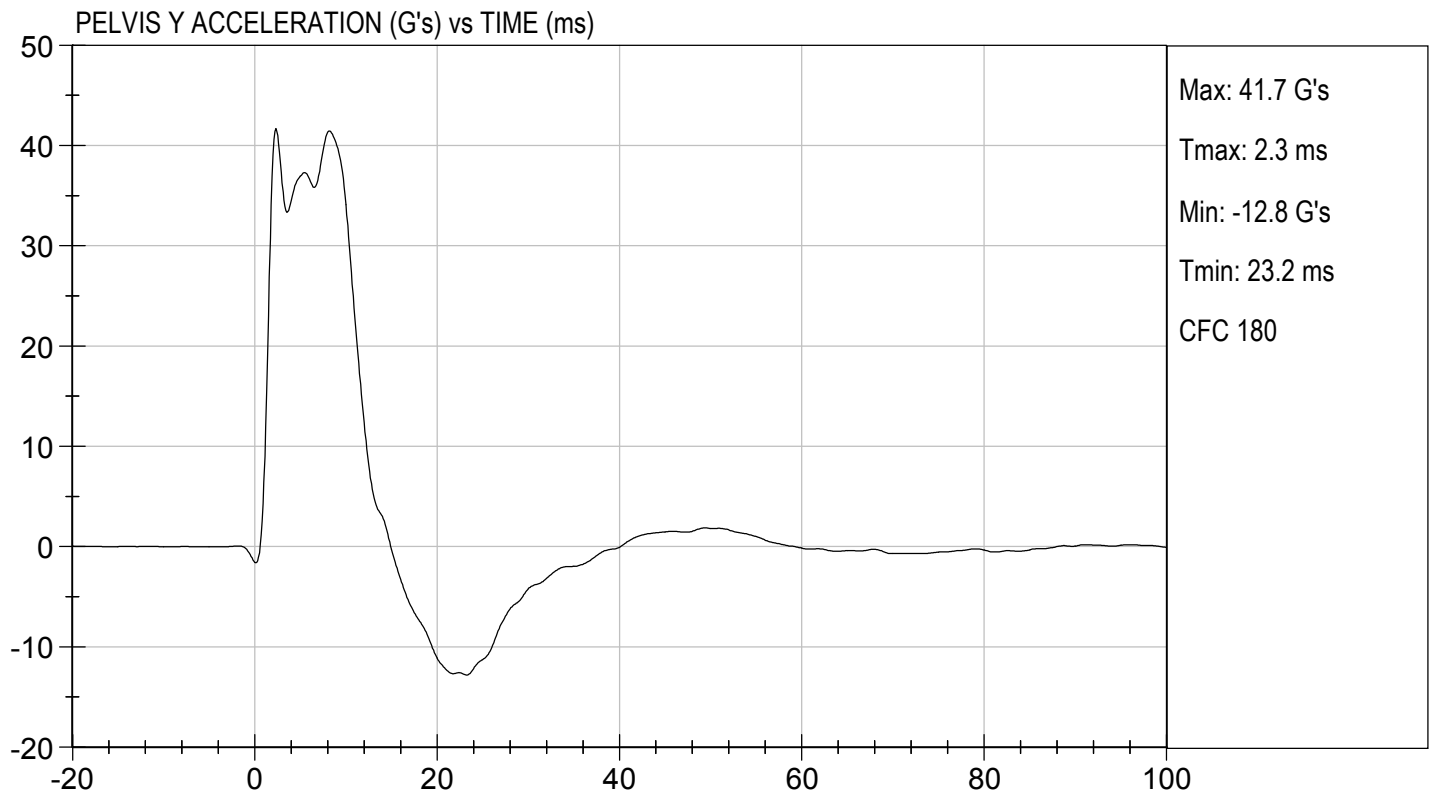
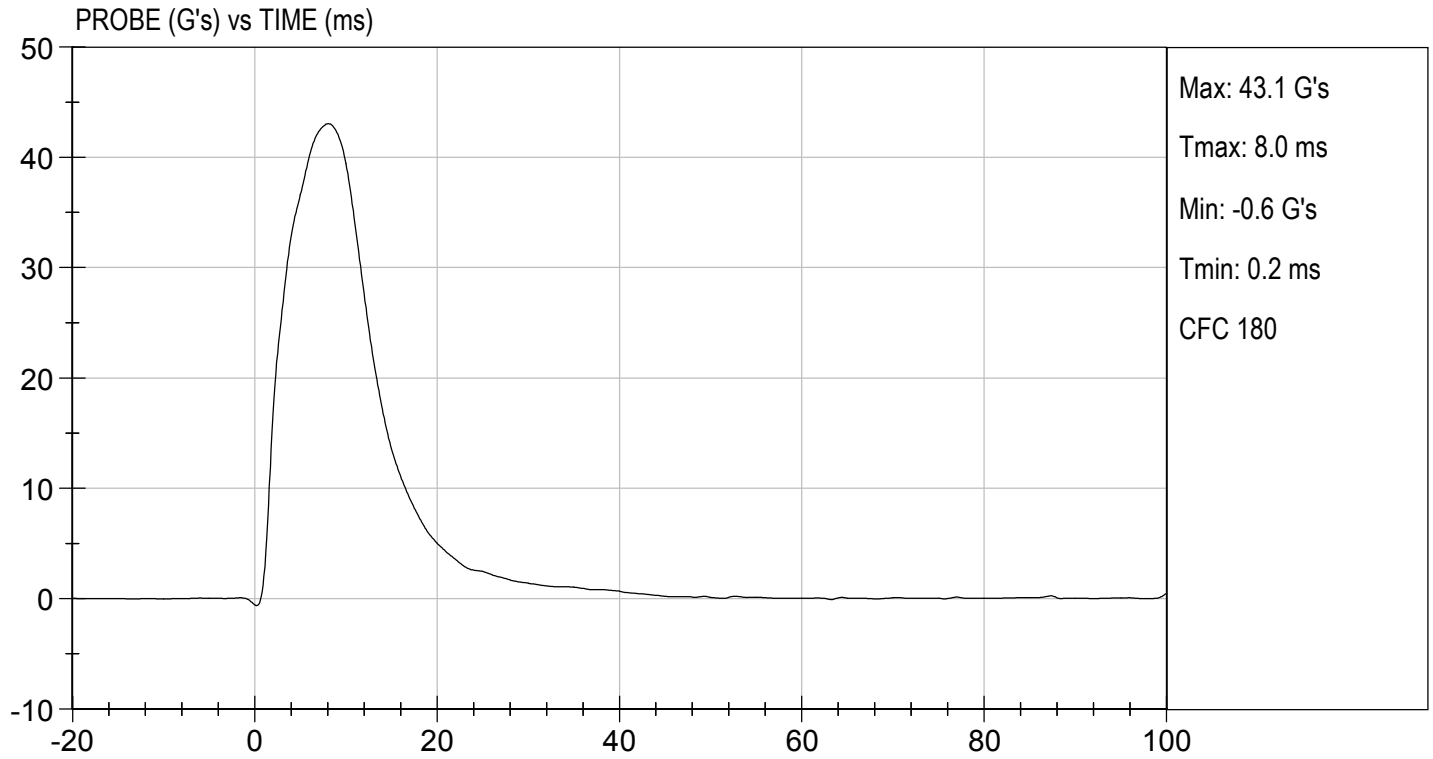
Test I.D: D173067

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.2 | Pass |
| Humidity | % | 10 to 70 | 43 | Pass |
| Impact Velocity | m/s | 6.60 to 6.80 | 6.60 | Pass |
| Maximum Probe Acceleration | G's | 38 to 47 | 43 | Pass |
| Pelvis Y Acceleration After 6 ms | G's | 34 to 42 | 41 | Pass |
| Peak Acetabulum Force | N | 3600 to 4300 | 3,930 | Pass |
| Overall Test Results | | | | Pass |

Danielle Redinlaugh
 Laboratory Technician

10/23/2017
 Test Date

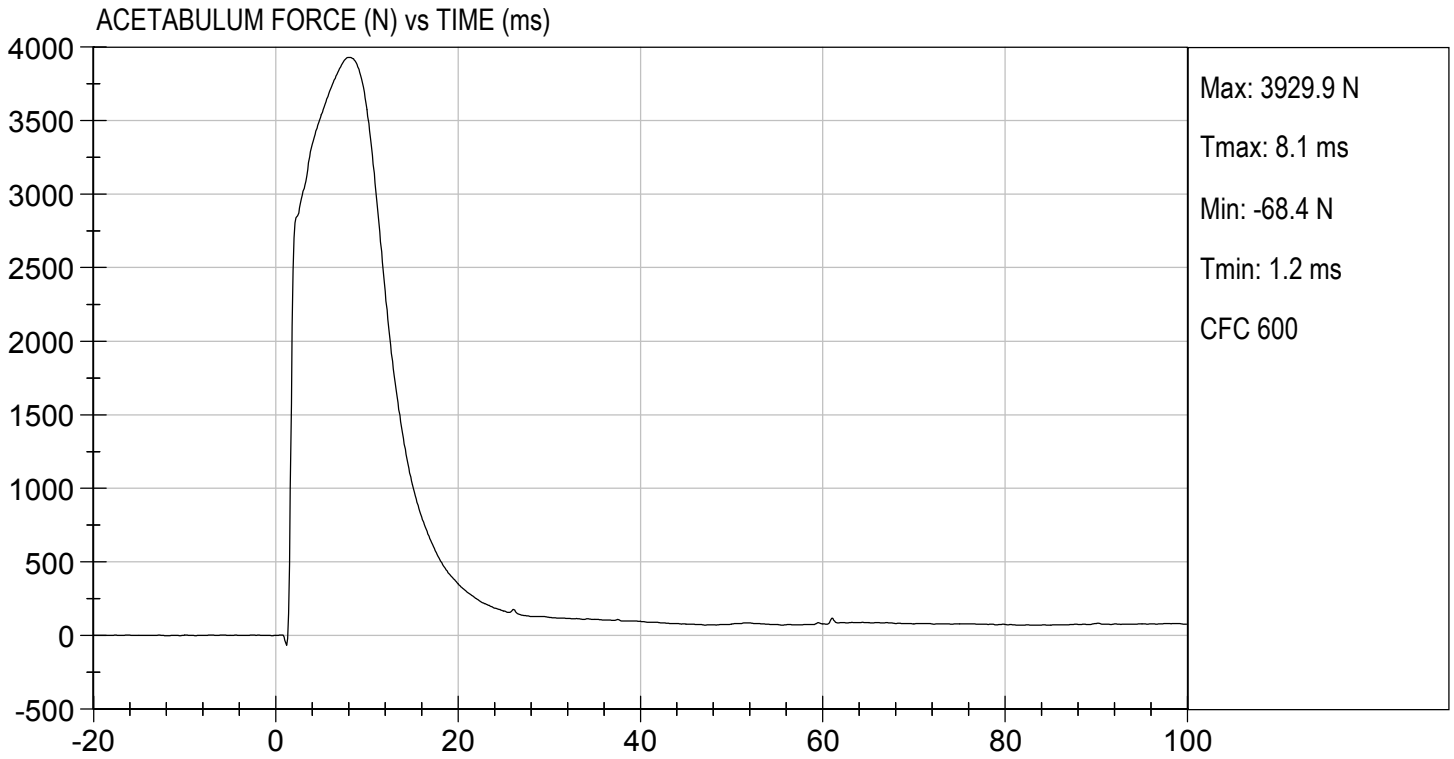
B. F. K.
 Approved By





TEST DESC: PELVIS IMPACT
VELOCITY: 21.65 ft/s, 6.60 m/s

TEST DATE: 10/23/2017
TEST #: D173067



MGA RESEARCH CORPORATION
ILIAC IMPACT TEST
SID-IIs BUILD LEVEL D DUMMY

ATD Serial No: 296

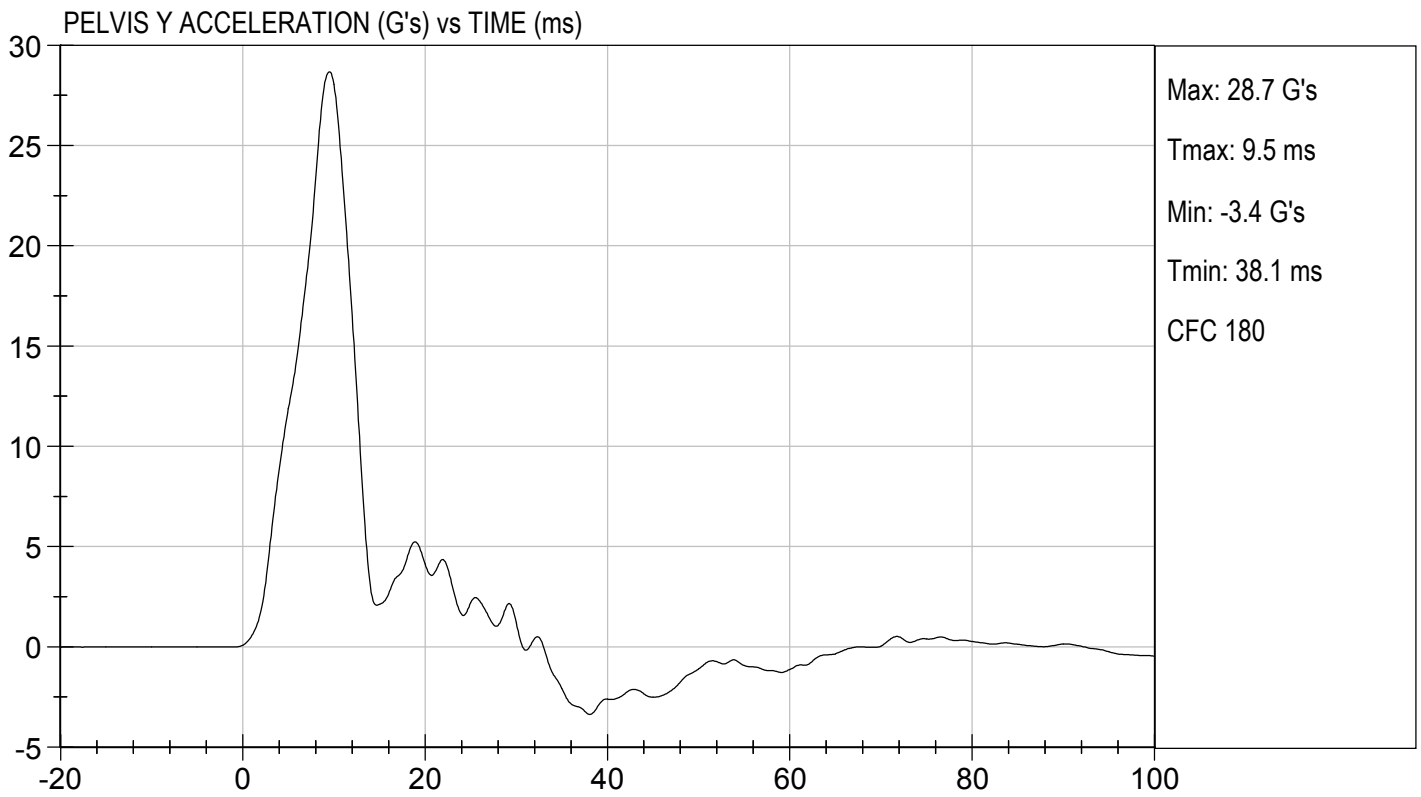
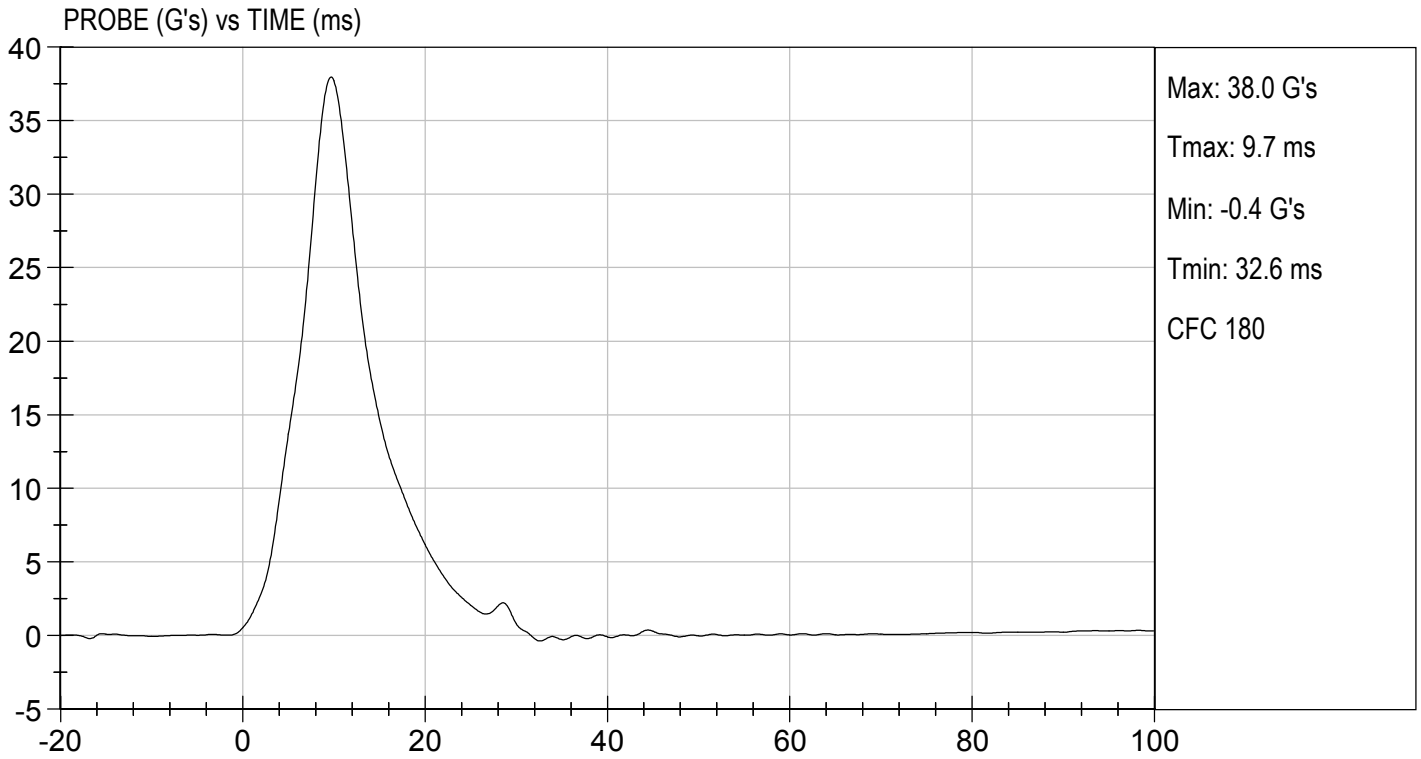
Test I.D: D173068

| Tested Parameter | Units | Specification | Result | Pass/Fail |
|----------------------------|-------|---------------|--------|-----------|
| Temperature | deg C | 20.6 to 22.2 | 21.2 | Pass |
| Humidity | % | 10 to 70 | 43 | Pass |
| Impact Velocity | m/s | 4.20 to 4.40 | 4.38 | Pass |
| Maximum Probe Acceleration | G's | 36 to 45 | 38 | Pass |
| Pelvis Y Acceleration | G's | 28 to 39 | 29 | Pass |
| Peak Pelvis Iliac Force | N | 4100 to 5100 | 4,373 | Pass |
| Overall Test Results | | | | Pass |

Danielle Redinlaugh
 Laboratory Technician

10/23/2017
 Test Date

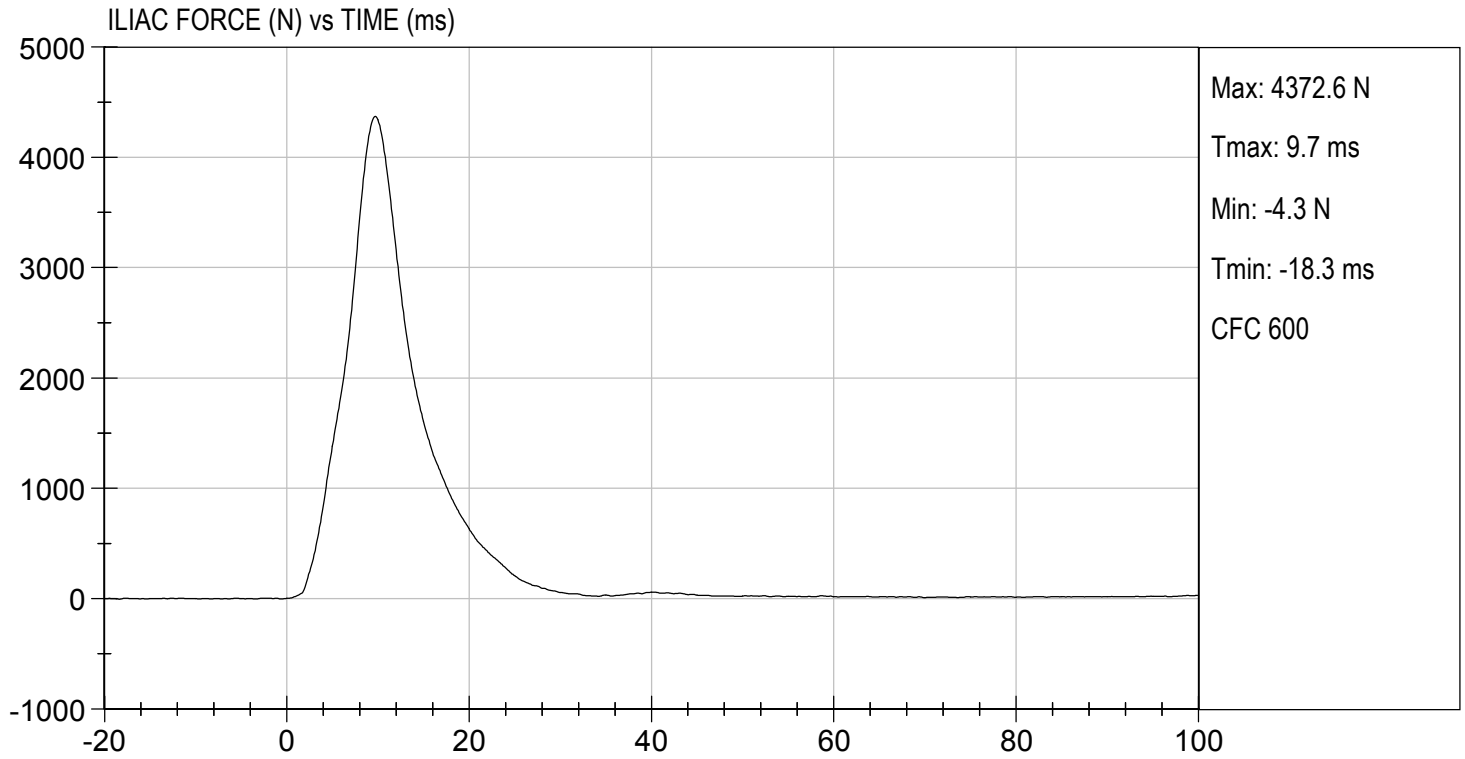
B. F.
 Approved By





TEST DESC: ILLIAC
VELOCITY: 14.37 ft/s, 4.38 m/s

TEST DATE: 10/23/2017
TEST #: D173068





SID-IIs Pelvis Plug Certification Test

Plug S/N 11429

Test Number 2898

Report Number 2895

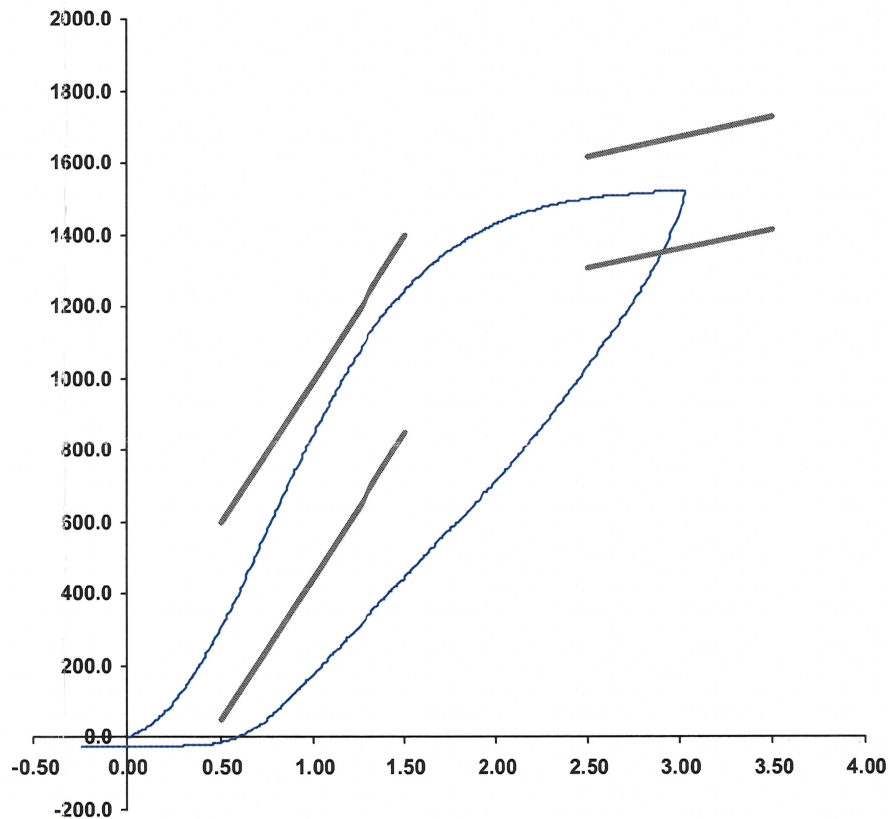
Test Date 8/29/2016 11:19:59 AM

| | <u>Test Results</u> | <u>Spec Min</u> | <u>Spec Max</u> |
|--------------------|---------------------|-----------------|-----------------|
| Force @ 0.5 mm (N) | 309.51 | 50.00 | 600.00 |
| Force @ 1.5 mm (N) | 1,246.44 | 850.00 | 1,400.00 |
| Force @ 2.5 mm (N) | 1,500.69 | 1,306.00 | 1,618.00 |
| Force @ 3.0 mm (N) | 1,522.68 | 1,361.00 | 1,673.00 |

Testing Machine STM-20 5965542
 Load Cell S/N (TI240813), Units (LBS) 1000
 Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator DC

Part Number 180-4450

Template No 107 29-Aug-16
 SACO Research

By: DC Date: 8/29/16



SID-IIs Pelvis Plug Certification Test

Plug S/N 11364

Test Number 2751

Report Number 2748

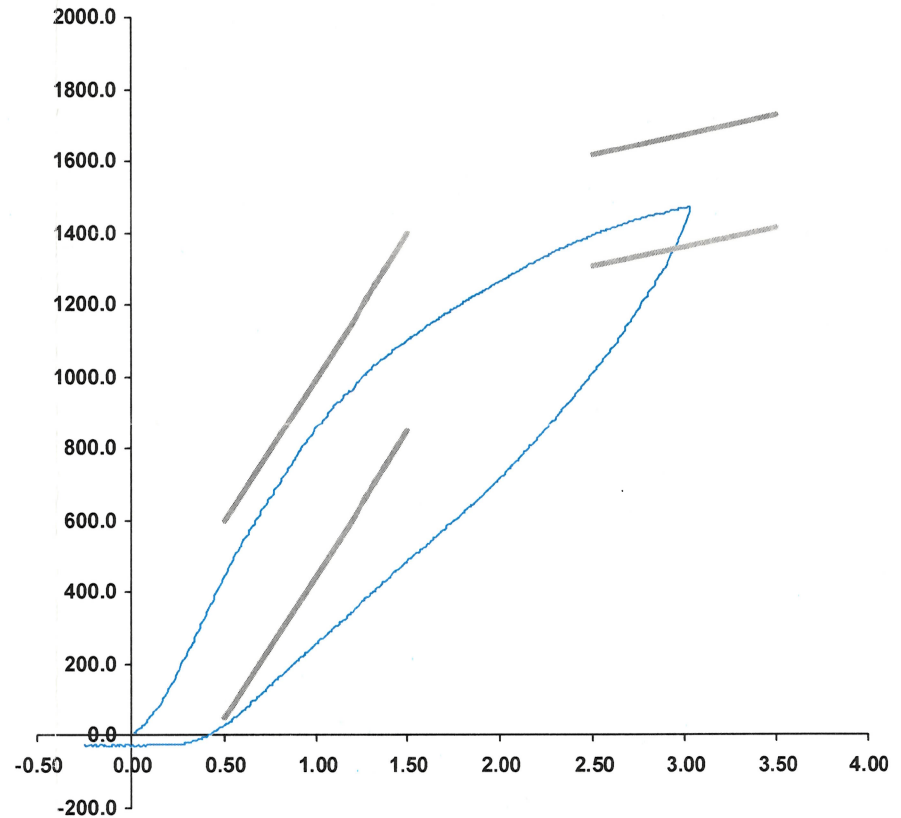
Test Date 5/3/2016 8:08:47 AM

| | Test Results | Spec Min | Spec Max |
|--------------------|--------------|----------|----------|
| Force @ 0.5 mm (N) | 442.77 | 50.00 | 600.00 |
| Force @ 1.5 mm (N) | 1,102.89 | 850.00 | 1,400.00 |
| Force @ 2.5 mm (N) | 1,391.24 | 1,306.00 | 1,618.00 |
| Force @ 3.0 mm (N) | 1,469.96 | 1,361.00 | 1,673.00 |

Testing Machine STM-20 5965542
 Load Cell S/N (T1240813), Units (LBS) 1000
 Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator DC
 Part Number 180-4450

Template No 107 03-May-16
 SACO Research

By : DC Date : 5/3/16

APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (ES-2re)

| | | ES-2re S/N 032 | | | |
|--|---------|----------------|--------------|------------------|------------|
| | | Serial Number | Manufacturer | Calibration Date | |
| Head CG Accelerometers | | X | P79711 | Endevco | 07/05/2017 |
| | | Y | P79712 | Endevco | 07/05/2017 |
| | | Z | P88170 | Endevco | 07/05/2017 |
| | | Xr | P79750 | Endevco | 07/05/2017 |
| | | Yr | P79751 | Endevco | 07/05/2017 |
| | | Zr | P79753 | Endevco | 07/05/2017 |
| Thorax Rib Displacement Potentiometers | Upper | Y | G176 | Honeywell | 07/11/2017 |
| | Middle | Y | G169 | Honeywell | 07/11/2017 |
| | Lower | Y | G164 | Honeywell | 07/11/2017 |
| Abdomen Load Cells | Forward | Y | ABG1513 | Denton | 10/26/2016 |
| | Middle | Y | ABG1531 | Denton | 10/26/2016 |
| | Rear | Y | ABG1536 | Denton | 10/26/2016 |
| Lower Spine Accelerometers (T12) | | X | P79574 | Endevco | 07/05/2017 |
| | | Y | P82097 | Endevco | 07/05/2017 |
| | | Z | P82603 | Endevco | 07/05/2017 |
| Public Symphysis Load Cell | | Y | PG462 | Denton | 10/26/2016 |

Table 2 – Dummy Instrumentation (SID-IIs)

| | | | | SID-IIs S/N 296 | | | |
|----------------------------------|---------------|--------|---|-----------------|--------------|------------------|------------|
| | | | | Serial Number | Manufacturer | Calibration Date | |
| Head CG Accelerometers | | | | X | P94783 | Endevco | 06/27/2017 |
| | | | | Y | P94784 | Endevco | 06/27/2017 |
| | | | | Z | P94786 | Endevco | 06/27/2017 |
| | | | | Xr | P94934 | Endevco | 06/27/2017 |
| | | | | Yr | P94936 | Endevco | 06/27/2017 |
| | | | | Zr | P94938 | Endevco | 06/27/2017 |
| Head Angular Rate Sensors | | | | X | ARS7413 | DTS | 07/15/2014 |
| | | | | Y | ARS7421 | DTS | 07/15/2014 |
| | | | | Z | ARS7423 | DTS | 07/15/2014 |
| Displacement Potentiometers | Thoracic Rib | Upper | Y | G012 | FTSS | 06/28/2017 | |
| | | Middle | Y | G1163 | FTSS | 06/28/2017 | |
| | | Lower | Y | G1158 | FTSS | 06/28/2017 | |
| | Abdominal Rib | Upper | Y | G1146 | FTSS | 06/28/2017 | |
| | | Lower | Y | G1126 | FTSS | 06/28/2017 | |
| Lower Spine Accelerometers (T12) | | | | X | P79418 | Endevco | 06/27/2017 |
| | | | | Y | P79439 | Endevco | 06/27/2017 |
| | | | | Z | P79614 | Endevco | 06/27/2017 |
| Acetabulum Load Cell | | | | Y | ACG4285 | Denton | 04/20/2017 |
| Iliac Wing Load Cell | | | | Y | IWG3023 | Denton | 04/20/2017 |
| Pelvis Plug (struck side) | | | | | 11429 | SACO | 08/29/2016 |
| Pelvis Plug (non-struck side) | | | | | 11364 | SACO | 05/03/2016 |

Table 3 – Vehicle Instrumentation

| | | | Serial Number | Manufacturer | Calibration Date |
|----|------------------------------|---|---------------|--------------|------------------|
| 1 | Vehicle Center of Gravity | X | T11645 | Endevco | 09/21/2017 |
| | Vehicle Center of Gravity | Y | T10428 | Endevco | 09/27/2017 |
| | Vehicle Center of Gravity | Z | T10875 | Endevco | 09/19/2017 |
| 2 | Right Sill at Front Seat | X | T11717 | Endevco | 10/04/2017 |
| | Right Sill at Front Seat | Y | T11763 | Endevco | 10/05/2017 |
| | Right Sill at Front Seat | Z | T11743 | Endevco | 10/02/2017 |
| 3 | Right Sill at Rear Seat | X | PCB605 | PCB | 08/24/2017 |
| | Right Sill at Rear Seat | Y | PCB687 | PCB | 08/24/2017 |
| | Right Sill at Rear Seat | Z | P79606 | Endevco | 09/07/2017 |
| 4 | Left Sill at Front Door | Y | T11662 | Endevco | 09/21/2017 |
| 5 | Left Sill at Rear Door | Y | T11757 | Endevco | 09/21/2017 |
| 6 | Left A-Post Lower | Y | T11753 | Endevco | 10/05/2017 |
| 7 | Left A-Post Middle | Y | T11650 | Endevco | 10/05/2017 |
| 8 | Left B-Post Lower | Y | | | |
| 9 | Left B-Post Middle | Y | | | |
| 10 | Front Seat Track | Y | T10887 | Endevco | 09/19/2017 |
| 11 | Rear Seat Track or Structure | Y | T10557 | Endevco | 08/07/2017 |
| 12 | Right Rear Occ. Compartment | Y | T11730 | Endevco | 09/21/2017 |
| 13 | Engine Block | X | T10266 | Endevco | 10/04/2017 |
| | Engine Block | Y | T10251 | Endevco | 10/05/2017 |
| 14 | Rear Floorpan Above Axle | X | T11656 | Endevco | 09/21/2017 |
| | Rear Floorpan Above Axle | Y | P94849 | Endevco | 09/19/2017 |
| | Rear Floorpan Above Axle | Z | T11781 | Endevco | 09/19/2017 |

Table 4 – MDB Instrumentation

| | | Serial Number | Manufacturer | Calibration Date |
|------------------------------------|---|---------------|--------------|------------------|
| MDB Center of Gravity | X | PCB661D | PCB | 08/21/2017 |
| MDB Center of Gravity | Y | PCB798D | PCB | 08/21/2017 |
| MDB Center of Gravity | Z | PCB660D | PCB | 08/21/2017 |
| Left Frame at Rear Axle Centerline | X | PCB495D | PCB | 08/21/2017 |
| Left Frame at Rear Axle Centerline | Y | PCB494D | PCB | 08/21/2017 |