Safety Compliance Testing For FMVSS 214

Side Impact Protection

Indicant
Toyota Motor Company
2007 Toyota Highlander SUV

NHTSA Number: C75104

Transportation Research Center Inc.
10820 State Route 347
P. O. Box B-67
East Liberty, OH 43319

Test Date: December 1, 2006
Final Report: December 15, 2006

U. S. Department Of Transportation
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
400 Seventh Street, S. W.
Room No. 6111 (NVS-220)
Washington, DC 20590
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Test Performed By: William Millis, Engineering Technician

Report Approved By: ____________________________

Walter Dudek, Project Manager
Transportation Research Center Inc.

Approval Date: 11/8/2006

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: ____________________________

Acceptance Date: ____________________________
The impact velocity of the Moving Deformable Barrier (MDB) was 62.0 km/h, and the ambient temperature at the struck (driver's side) side of the target vehicle at the time of impact was 21° C. The target vehicle’s post-test maximum crush was 288 mm at Level 2.

The two 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 side impact event.

| Left Upper Rib Acceleration: | 29.6 g's | 52.2 g's |
| Left Lower Rib Acceleration: | 25.1 g's | 50.6 g's |
| Lower Spine Acceleration:     | 31.1 g's | 55.0 g's |
| Thoracic Trauma Index, (TTI): | 30.3 g's | 53.6 g's |
| Pelvis Acceleration (PEV):    | 54.0 g's | 85.1 g's |

The test or target vehicle’s performance is given below (with FIR filter):
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Section 1

Purpose and Test Procedure

This side impact test is part of the FMVSS 214 Side Impact Protection Compliance Test Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-02-D-11114. The purpose of this test was to evaluate side impact protection in a 2007 Toyota Highlander SUV. The test was conducted in accordance with the Office of Vehicle Safety Compliance’s Laboratory Test Procedure (TP-214D-06, dated July 2001) (except the test was conducted 8 km/h (5 mph) faster than the standard specifies).
Section 2

Summary of Side Impact Test

A 2007 Toyota Highlander SUV was impacted on the driver's side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the monorail at a velocity of 62.0 km/h (38.5 mph). 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 Transportation Research Center Inc. in East Liberty, Ohio on December 1, 2006. Pre-test and post-test photographs of the test vehicle, the moving deformable barrier (MDB), and the side impact dummies (SID HIIs) are included in Appendix A.

Two restrained Side Impact Dummies (SID HIIs) were placed in the driver (Pos. #1) and left rear (Pos. #4) designated seating positions according to the instructions specified in the OVSC Side Impact Laboratory Test Procedure (TP-214D-06, dated July 2001). Both SID HIII dummies were certified prior to this test. The side impact test was documented by one real-time camera and 9 high-speed cameras. Camera locations and other pertinent camera information are included in this report.

The SID HIIs were instrumented with the following accelerometers:

1. Head (HED) triaxial and redundant accelerometers (X, Y, and Z-directions)
2. Neck (NEK) triaxial force and moment load cells (X, Y, and Z-directions)
3. Left Upper Rib (LUR) uniaxial and redundant accelerometer (Y-direction)
4. Left Lower Rib (LLR) uniaxial and redundant accelerometer (Y-direction)
5. Lower Thoracic Spine (T_{12}) uniaxial accelerometer (Y-direction)
6. Pelvic (PEV) section uniaxial accelerometer (Y-direction)

A summary of the side impact dummy (SID HIII) configuration and verification test data can be found in Appendix C. A total of 66 channels of data were recorded. Appendix B contains the vehicle, MDB, and dummy response data traces.
The following tables summarize the results of the test:

<table>
<thead>
<tr>
<th>Injury Criteria</th>
<th>Front SID HIII</th>
<th>Rear SID HIII</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTI (g)</td>
<td>30.3</td>
<td>53.6</td>
</tr>
<tr>
<td>PEV (g)</td>
<td>54.0</td>
<td>85.1</td>
</tr>
</tbody>
</table>
Data Acquisition Explanations

The vehicle’s left side sill at front seat Y-axis acceleration data channel, 14SILBFR0000ACYA, exceeded full-scale at approximately 34 milliseconds and recorded no useful data after that. The velocity and displacement were also affected.

The vehicle’s left lower B-post Y-axis acceleration data channel, 14BPIILO0000ACYA, exceeded full-scale at approximately 25 milliseconds and recorded no useful data after that. The velocity was also affected.

The vehicle’s left mid B-post Y-axis acceleration data channel, 14BPILMI0000ACYA, recorded questionable data after approximately 40 milliseconds. The velocity was also affected.
Section 3

Summary of Test Results
Data Sheet 1

General Test Vehicle Parameter Data

Test Vehicle Information:
Vehicle Year/Make/Model: 2007 Toyota Highlander
Vehicle Body Style/Color: SUV/Silver
Vehicle NHTSA No.: C75104
VIN: JTEGD21A570155624
Build Date: 08/06

Engine Data:
- 4 Cylinders; 2.4 Liters; 24 cc
- Placement: Longitudinal; or Lateral; or Horizontal

Transmission:
- 4 Speed; Manual; Automatic; Overdrive

Final Drive:
- RWD; FWD; Four-Wheel Drive

Odometer Reading: 181 miles

Options:
- A/C; Power steering; Power brakes; Power windows

Data From Vehicle’s Tire Placard:
- Tire Pressure (at capacity) 210 kPa Front; 210 kPa Rear
- Recommended Tire Size: P225/70R16
- Tires on Test Vehicle: P225/70R16 Manufacturer: Toyo, Tranpath

Vehicle Capacity Data:
- Number of Occupants: 2 Front; 3 Rear; 3rd seat; 5 Total
- Type of Front Seats: Bucket; Bench; Split bench
- Type of Front Seat Back: Fixed; Adjustable with Lever or Knob
- Vehicle Max. Capacity Loading = 390 kg (A)
- No. of Occupants x 68.04 kg. = 340 kg (B)
- Vehicle Cargo Capacity (A-B) = 50 kg

Test Vehicle Delivered Weight With Maximum Fluids:
- Left Front = 455.8 kg
- Right Front = 447.2 kg
- Total Front = 903.0 kg
- Left Rear = 361.4 kg
- Right Rear = 348.2 kg
- Total Rear = 709.6 kg
- Front % of Total Weight = 56.0 %
- Rear % of Total Weight = 44.0 %
- Total Weight = 1612.6 kg

1 Tire pressure used in test.
Data Sheet 1 (Continued)

General Test Vehicle Parameter Data

Calculation Of Vehicle’s Target Test Weight:

Total Test Vehicle Delivered Weight With Max. Fluids = 1612.6 kg (A)
Maximum Cargo Carrying Capacity of Test Vehicle = 50.0 kg (B)
Weight of Instrumented Side Impact Dummies (2 X 84.0 kg) = 168.0 kg (C)
Test Vehicle Target Weight: = 1830.6 kg (A+B+C)

Fully Loaded Test Vehicle (UDW + 2 SID HIII s + Cargo):

Left Front = 507.0 kg  Left Rear = 463.4 kg
Right Front = 447.4 kg  Right Rear = 415.6 kg
Total Front = 954.4 kg  Total Rear = 879.0 kg
Front % of Total Weight = 52.1 %  Rear % of Total Weight = 47.9 %
Total Weight = 1833.4 kg

As Tested Weight of Test Vehicle (2 SID HIII s + Cargo):

Left Front = 513.2 kg  Left Rear = 436.0 kg
Right Front = 458.2 kg  Right Rear = 414.4 kg
Total Front = 971.4 kg  Total Rear = 850.4 kg
Front % of Total Weight = 53.3 %  Rear % of Total Weight = 46.7 %
Total Weight = 1821.8 kg

Test Vehicle Attitude (all dimensions in millimeters):

<table>
<thead>
<tr>
<th>As Delivered</th>
<th>Fully Loaded</th>
<th>Ready For Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Front</td>
<td>793</td>
<td>Right Front</td>
</tr>
<tr>
<td>Left Front</td>
<td>793</td>
<td>Left Front</td>
</tr>
<tr>
<td>Right Rear</td>
<td>808</td>
<td>Right Rear</td>
</tr>
<tr>
<td>Left Rear</td>
<td>800</td>
<td>Left Rear</td>
</tr>
</tbody>
</table>
### Data Sheet 1 (Continued)

**General Test Vehicle Parameter Data**

#### Test Vehicle Attitude:

<table>
<thead>
<tr>
<th></th>
<th>Left Sill Pitch</th>
<th>Right Sill Pitch</th>
<th>Front Bumper L-R Roll</th>
<th>Rear Bumper L-R Roll</th>
</tr>
</thead>
<tbody>
<tr>
<td>As Delivered:</td>
<td>-0.4°</td>
<td>-0.6°</td>
<td>-0.3°</td>
<td>0°</td>
</tr>
<tr>
<td>Fully Loaded:</td>
<td>-0.2°</td>
<td>-0.1°</td>
<td>-0.6°</td>
<td>-0.3°</td>
</tr>
<tr>
<td>As Tested:</td>
<td>-0.1°</td>
<td>0°</td>
<td>-0.3°</td>
<td>-0.2°</td>
</tr>
</tbody>
</table>

Negative Pitch Angle = Vehicle front down

Negative Roll Angle = Driver side down

#### Test Vehicle Wheelbase:

2715 mm

C.G. = 1267 mm rearward of front wheel centerline

#### Total Vehicle Length:

Right Side = 4460 mm

Left Side = 4460 mm

Centerline = 4690 mm
Data Sheet 1 (Continued)

General Test Vehicle Parameter Data

Vehicle: 2007 Toyota Highlander SUV  
NHTSA No.: C75104

Nominal Design Riding Position for adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.

Front Seat Cushion Placement: Detent 9 of 17 detents

Total Length of Fore/Aft Adjustment Travel: 252 mm

Total Number of Adjustment Positions or Detents: 17

Front Seat Back Adjustment Position: 5th detent rearward of full up

Seat Back Torso Angle: 25 degrees

Second Position Seat Placement: Detent 5 of 10 detents

Total Length Of Fore/Aft Adjustment Travel: 120 mm

Seat Back Adjustment Position: 2nd detent rearward of full up

Adjustable Steering Column Position: 27.9°; middle of geometric range of travel

Window Positions:
Right Front: Open  
Right Rear: Open
Left Front: Closed  
Left Rear: Closed

Note: Windows will be in closed position on struck side of test vehicle and in open position on opposite side.

Amount of Stodard Solvent In Fuel Tank:
72.7 liters (fuel tank usable capacity)  
67.4 liters used in test (92% - 94% of fuel tank usable capacity)

Location of Impact Point On Test Vehicle Side To Be Impacted:
Wheelbase = 2715 millimeters

Intended impact point is 418 millimeters rearward of front axle centerline

(which is 940 millimeters forward of the wheelbase midpoint)

Actual Impact Point is 428 millimeters rearward of front axle centerline
Data Sheet 2

Test Vehicle Summary of Results

Vehicle Year/Make/Model: 2007/Toyota/Highlander

Body Style: SUV

VIN: JTEGD21A570155624

NHTSA No.: C75104

Build Date: 8/06

Test Date: 12/01/06

Vehicle Overall Length = 4690 mm

Overall Width = 1825 mm

Vehicle Test Weight (Pre-Test):  
- Left Front = 513.2 kg
- Left Rear = 436.0 kg
- Right Front = 458.2 kg
- Right Rear = 414.4 kg
- Total Front = 971.4 kg
- Total Rear = 850.4 kg
- Total Weight = 1821.8 kg

Wheelbase = 2715 mm

Longitudinal C.G. From Center Of Front Axle = 1267 mm

Impact Angle With Respect To Impactor = 90 degrees

Impact Point:
- Actual Impact Point is 10 mm right of nominal impact ref. line (Lateral)
- Actual Impact Point is 1 mm up from nominal impact point (Vertical)

Maximum Exterior Static Crush:

1. Level 1 (377 mm above ground) = 130 mm
2. Level 2 (711 mm above ground) = 288 mm
3. Level 3 (770 mm above ground) = 282 mm
4. Level 4 (1083 mm above ground) = 191 mm
5. Level 5 (1620 mm above ground) = 0 mm

Maximum Post-Test Intrusion = 288 mm

Occupants: Front Passenger Rear Passenger

Dummy Identification 055 059

Restraints Used 3-pt. seat belt, side curtain 3-pt. seat belt, side curtain airbag

and torso airbags

Instrumentation:

Number of Vehicle Data Channels: = 21

Number of Cameras: Onboard = 3 Offboard = 6 Total = 9
Data Sheet 3

Moving Deformable Barrier (MDB) Summary

MDB Face Manufacturer And Serial Number:

Cellbond, GI319

Position Of Impactor (MDB) On Monorail:

Crabbed 27° to the left

MDB Specifications:

Overall Width of Framework Carriage = 1251 mm
Overall Length of MDB (Incl. honeycomb impact face) = 4014 mm
Wheelbase of Framework Carriage = 2591 mm
Track of Framework Carriage (Front & Rear) = 1881 mm
C.G. Location Rearward of Front Axle = 1103 mm

MDB Weight:

Left Front = 395.6 kg
Left Rear = 287.4 kg
Right Front = 385.8 kg
Right Rear = 292.2 kg
Total Front = 781.4 kg
Total Rear = 579.6 kg
Total MDB Weight = 1361.0 kg

Impact Angle (MDB C/L to Target Vehicle C/L) = 90 degrees
Impact Speed = 62.0 km/h

Maximum Static Crush of Honeycomb Impact Face:

1. Row A at Center of Bumper Level = 197 millimeters
2. Row B at Top of Bumper Level = 116 millimeters
3. Row C at Mid Level = 120 millimeters
4. Row D at Top of Stack Level = 152 millimeters

Instrumentation:

Number of MDB Data Channels = 7
Post-Test Observations

Vehicle: 2007 Toyota Highlander SUV  NHTSA No.: C75104

Visible Dummy Contact Points:

<table>
<thead>
<tr>
<th></th>
<th>Left Front SID HIII</th>
<th>Left Rear SID HIII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>Curtain airbag</td>
<td>Curtain airbag</td>
</tr>
<tr>
<td>Upper Torso</td>
<td>Torso airbag</td>
<td>Door panel</td>
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<tr>
<td>Lower Torso</td>
<td>Torso airbag</td>
<td>Door panel</td>
</tr>
<tr>
<td>Left Knee</td>
<td>Door panel</td>
<td>Door panel</td>
</tr>
<tr>
<td>Right Knee</td>
<td>None</td>
<td>None</td>
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Door Opening:

<table>
<thead>
<tr>
<th></th>
<th>Left Side</th>
<th>Right Side</th>
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<tbody>
<tr>
<td>Front</td>
<td>Jammed and latched</td>
<td>Easy</td>
</tr>
<tr>
<td>Rear</td>
<td>Jammed and latched</td>
<td>Easy</td>
</tr>
</tbody>
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MDB Distance From Target Impact Point:

- Vertical: 1 mm up from target
- Horizontal: 10 mm right from target

Arm Rest Locations:

<p>| | |</p>
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<tbody>
<tr>
<td>Front</td>
<td>213 mm below the bottom of the window</td>
</tr>
<tr>
<td>Rear</td>
<td>248 mm below the bottom of the window</td>
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Seat Movement:

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<tbody>
<tr>
<td>Front</td>
<td>None</td>
</tr>
<tr>
<td>Rear</td>
<td>None</td>
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</table>

Glazing Damage:

<p>| | |</p>
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<tr>
<td>Windshield</td>
<td>None</td>
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<tr>
<td>Window</td>
<td>Left side rear passenger window broken</td>
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Pillar Separation: None

Sill Separation: None

Other Notable Impact Effects:

None
Section 4

Occupant and Vehicle Information
## SID HIII Instrumentation Data

**Vehicle:** 2007 Toyota Highlander SUV  
**NHTSA No.:** C75104  
**Test Number:** 061201  
**Driver Dummy Serial Number:** 055

<table>
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<th>Negative Direction</th>
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<tbody>
<tr>
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<td>Max. (g)</td>
<td>Time (ms)</td>
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<tr>
<td>Head Acceleration (g)</td>
<td></td>
<td></td>
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<tr>
<td>Longitudinal X</td>
<td>3.0</td>
<td>199.0</td>
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<tr>
<td>Lateral Y</td>
<td>19.6</td>
<td>50.6</td>
</tr>
<tr>
<td>Vertical Z</td>
<td>17.8</td>
<td>57.0</td>
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<td>Resultant</td>
<td>30.6</td>
<td>57.0</td>
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<tr>
<td>HIC 36</td>
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<td></td>
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<tr>
<td>Head Redundant Acceleration (g)</td>
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<tr>
<td>Longitudinal X</td>
<td>3.0</td>
<td>203.0</td>
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<tr>
<td>Lateral Y</td>
<td>18.7</td>
<td>47.5</td>
</tr>
<tr>
<td>Vertical Z</td>
<td>17.3</td>
<td>56.8</td>
</tr>
<tr>
<td>Resultant</td>
<td>30.3</td>
<td>57.1</td>
</tr>
<tr>
<td>Neck Force</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X-Axis Shear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y-Axis Shear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z-Axis Shear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neck Moment</td>
<td></td>
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</tr>
<tr>
<td>About X-Axis</td>
<td>2.6</td>
<td>210.8</td>
</tr>
<tr>
<td>About Y-Axis</td>
<td>19.0</td>
<td>77.3</td>
</tr>
<tr>
<td>About Z-Axis</td>
<td>37.1</td>
<td>72.6</td>
</tr>
<tr>
<td>Occipital Condyle</td>
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<td></td>
</tr>
<tr>
<td>Left Upper Rib Acceleration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral (P)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral (R)</td>
<td></td>
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<tr>
<td>Left Lower Rib Acceleration</td>
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<tr>
<td>Lateral (P)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral (R)</td>
<td></td>
<td></td>
</tr>
</tbody>
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## SID III Instrumentation Data

**Vehicle:** 2007 Toyota Highlander SUV  
**NHTSA No.:** C75104  
**Test Number:** 061201  
**Driver Dummy Serial Number:** 055

<table>
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<th>Location</th>
<th>Positive Direction</th>
<th>Negative Direction</th>
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<tbody>
<tr>
<td></td>
<td>Max. Time</td>
<td>Max. Time</td>
</tr>
<tr>
<td></td>
<td>(g)</td>
<td>(ms)</td>
</tr>
<tr>
<td>Lower Spine Acceleration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral (P)</td>
<td>31.1</td>
<td>40.0</td>
</tr>
<tr>
<td>Lateral (R)</td>
<td>30.8</td>
<td>40.0</td>
</tr>
<tr>
<td>Pelvis Acceleration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral (P)</td>
<td>54.0</td>
<td>37.5</td>
</tr>
<tr>
<td>TTI</td>
<td>30.3</td>
<td></td>
</tr>
</tbody>
</table>

**Positive Direction**  
- Longitudinal: Forward  
- Lateral: Rightward  
- Vertical: Downward

**Negative Direction**  
- Longitudinal: Rearward  
- Lateral: Leftward  
- Vertical: Upward
## SID HIII Instrumentation Data

**Vehicle:** 2007 Toyota Highlander SUV  
**NHTSA No.:** C75104  
**Test Number:** 061201  
**Left Rear Dummy Serial Number:** 059

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Data Sheet 5 (Continued)

SID HIII Instrumentation Data

Vehicle: 2007 Toyota Highlander SUV  
NHTSA No.: C75104

Test Number: 061201  
Left Rear Dummy Serial Number: 059

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Positive Direction

Longitudinal: Forward
Lateral: Rightward
Vertical: Downward

Negative Direction

Longitudinal: Rearward
Lateral: Leftward
Vertical: Upward
Data Sheet 6

Vehicle Pre-Test And Post-Test Measurements

Vehicle: 2007 Toyota Highlander SUV  NHTSA No.: C75104

Note: All dimensions are in millimeters with tolerance of ±3 mm

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D = Length at centerline   E and L = Bumper Thickness   R = Right Side Length
S = Left Side Length   T = Width at B-pillar   J1 = To Pinch Weld   J2 = To Sill
Data Sheet 7

SID HIII Longitudinal Clearance Dimensions

Vehicle: 2007 Toyota Highlander SUV  
NHTSA No.: C75104

Left Side View

Note: All measurements are in millimeters with tolerance of ±3 mm

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Note: 2-door vehicle shown. Rear dummy PHX and PHZ measurements for 4-door vehicle would use the C-post striker as a reference point.
SID HIII Lateral Clearance Dimensions

Vehicle: 2007 Toyota Highlander SUV  
NHTSA No.: C75104

Note: All measurements are in millimeters with tolerance of ±3 mm

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* Lower measurement is taken laterally at center of the lower rib accelerometer height from the SID HIII arm segment to the closest part of the vehicle side.

Upper measurement is taken laterally at center of the upper rib accelerometer height from the SID HIII arm segment to the closest part of the vehicle side.
Vehicle Side Measurements

Vehicle: 2007 Toyota Highlander SUV

NHTSA No.: C75104

Measurements Are Taken When The Vehicle Is In The “As Tested” Configuration.

Measurements along the vertical 750 mm line shown above:

- Level 5 @ Window Top = 1620 mm
- Level 4 @ Window Sill = 1083 mm
- Level 3 @ Mid Door = 770 mm
- Level 2 @ Occupant H-Point = 711 mm
- Level 1 @ Axle Centerline Height (or Sill Top Height) = 377 mm
# Data Sheet 10

## Vehicle Exterior Crush Profiles - All Levels

Vehicle: 2007 Toyota Highlander SUV

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Data Sheet 10 (Continued)

Vehicle Exterior Crush Profiles - All Levels

Vehicle: 2007 Toyota Highlander SUV

| Location     | Height | Pre   | 1050 | 1200 | 1250 | 1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 | 1850 | 1900 | 1950 | 2000 | 2050 | 2100 | 2150 | 2200 | 2250 | 2300 | 2350 | 2400 | 2450 | 2500 | 2550 | 2600 | 2650 | 2700 |
|--------------|--------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|

All measurements were recorded using TRC Inc.'s FARO Arm with a tolerance of ± 0.1 mm.
Data Sheet 11
Vehicle Damage Profile Distances

Vehicle: 2007 Toyota Highlander SUV
NOTE: All measurements are in millimeters (mm) and should be accurate to plus or minus 3mm.

TEST VEHICLE LONGITUDINAL CENTERLINE

MEASUREMENT CONVENTIONS:
Forward of the impact point (towards front of vehicle) is considered negative (-)
Rearward of the impact point (towards rear end of vehicle) is considered positive (+)

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Full length of induced damage was 2100 mm.
Data Sheet 12
Exterior Static Crush For Impactor Face
(Grid as looking at MDB from front)

Vehicle: 2007 Toyota Highlander SUV

NOTE: Dimensions shown in millimeters, mm
Data Sheet 12 (Continued)

Exterior Static Crush For Impactor Face

Vehicle: 2007 Toyota Highlander SUV

NHTSA No.: C75104

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All measurements were recorded using TRC Inc.'s FARO Arm with a tolerance of ± 0.1 mm.

$^1$ Top Bumper measurements are collected at 560 mm to eliminate post-test measurement point obstruction by the bumper element.
### Exterior Static Crush For Impactor Face

**Vehicle: 2007 Toyota Highlander SUV**

#### Deformable Barrier Face Profile

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## Data Sheet 12 (Continued)

### Exterior Static Crush For Impactor Face

**Vehicle:** 2007 Toyota Highlander SUV  
**Deformable Barrier Face Profile Cont’d.**

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**Exterior Static Crush For Impactor Face**

**Vehicle:** 2007 Toyota Highlander SUV

**Deformable Barrier Face Profile Cont'd.**

**NHTSA No.: C75104**

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Data Sheet 12 (Continued)

Exterior Static Crush For Impactor Face

Vehicle: 2007 Toyota Highlander SUV

Deformable Barrier Face Profile 1-17

-600.0 -550.0 -500.0 -450.0 -400.0 -350.0 -300.0 -250.0 -200.0 -150.0 -100.0 -50.0 0.0 200.0 400.0 600.0 800.0 1000.0

-1000.0 -800.0 -600.0 -400.0 -200.0 0.0

mm

Pre-Test
Post-Test

NHTSA No.: C75104
Data Sheet 12 (Continued)

Exterior Static Crush For Impactor Face

Vehicle: 2007 Toyota Highlander SUV

Deformable Barrier Face Profile 18-34

NHTSA No.: C75104
Data Sheet 12 (Continued)

Exterior Static Crush For Impactor Face

Vehicle: 2007 Toyota Highlander SUV

Deformable Barrier Face Profile 35-51

NHTSA No.: C75104
Data Sheet 12 (Continued)

Exterior Static Crush For Impactor Face

Vehicle: 2007 Toyota Highlander SUV

Deformable Barrier Face Profile 52-68

NHTSA No.: C75104
Vehicle: 2007 Toyota Highlander SUV
NHTSA No.: C75104

1-Right Front Side Sill
2-Right Side Sill at Rear Seat
3-Rear Floorpan above Axle
4-Left Side Sill at Rear Seat
5-Left Front Side Sill
7-Right Rear Occupant Compartment
12-Left Side Lower B-pillar
13-Left Side Middle B-pillar
14-Left Side Lower A-pillar
15-Left Side Middle A-pillar
16-Left Side Front Seat Track at H-point
17-Left Rear Seat Track at H-point
18-Vehicle Center of Gravity
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# Test Vehicle Accelerometer Locations and Data Summary

Vehicle: 2007 Toyota Highlander SUV  
NHTSA No.: C75104

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Reference:  
X: + Forward from rear bumper  
Y: + Rightward from vehicle centerline  
Z: + Downward from ground level

For acceleration data sign convention see Report Sign Convention in Appendix D.

---

1 See Data Acquisition Explanations
# Data Sheet 14

## MDB Accelerometer Locations and Data Summary

**Vehicle:** 2007 Toyota Highlander SUV  
**NHTSA No.:** C75104

### Coordinates

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*Reference:*  
X = Rear Bumper (+ Forward)  
Y = Vehicle Centerline (+ To Right)  
Z = Ground Level (+ Down)  

All measurements accurate to within ±3 mm.
### Data Sheet 15

#### High-Speed Camera Locations and Data Summary

**Vehicle:** 2007 Toyota Highlander SUV  
**NHTSA No.:** C75104

![Diagram of camera locations](image)

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<th>Angle (deg.)</th>
<th>Lens (mm)</th>
<th>Speed (fps)</th>
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<td>Y: 2150</td>
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<td>Z: -5750</td>
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<td>Y: 10200</td>
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<td>Y: -40</td>
<td>Z: -720</td>
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<td>Y: 830</td>
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<td>Z: -1180</td>
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+X: Forward (referenced to MDB) from impact point  
+Y: Rightward (referenced to MDB) from impact point  
+Z: Downward from ground level
Section 5

Vehicle Fuel System Integrity
Data Sheet 16

FMVSS 301 Fuel System Integrity Data

NHTSA No.: C75104  Test Date: 12/01/06

Vehicle Year/Make/Model/Body Style: 2007 Toyota Highlander SUV

Test Vehicle Impact Type:
- ____ Frontal (48.3 km/h)
- ____ Oblique (48.3 km/h) with ____° barrier face first contacting the (driver/pasenger) side
- ____ Rear Moving Barrier (48.3 km/h)
- ____ Lateral Moving Barrier (32.2 km/h)
- ____ Side Impact Moving Deformable Barrier (62.0 km/h) contacting the driver's side

Fuel Spillage Measurement:

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<td>3. For next 25 minutes.</td>
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<td>28 g/1 minute</td>
</tr>
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</table>

Solvent Spillage Details:
None
Data Sheet 17

FMVSS 301 Rollover Data

Vehicle: 2007 Toyota Highlander SUV  
NHTSA No.: C75104

0 - 90 Degrees

1. Determination of Solvent Collection Time Period:
   
   Rollover Fixture 90° Rotation Time  
   (Spec. Range = 1 to 3 minutes)
   
   FMVSS 301 Position Hold Time  
   +
   
   Total

   Next whole minute interval

2. FMVSS 301 Requirements:
   
   (1) Time Period

   First 5 minutes from onset of rotation  
   6th min.  
   7th min.  
   8th min. (if required)

   (2) Maximum Allowable Solvent Spillage

   142 g  
   28 g   
   28 g   
   28 g

3. Actual Test Vehicle Solvent Spillage:

   0 g  
   0 g  
   0 g   
   N/A

   Note: Record spillage for whole minute intervals only as determined above.

4. Solvent Spillage Location(s):
   
   None
FMVSS 301 Rollover Data

Vehicle: 2007 Toyota Highlander SUV  NHTSA No.: C75104

90 - 180 Degrees

1. **Determination of Solvent Collection Time Period:**

   Rollover Fixture 90° Rotation Time  
   (Spec. Range = 1 to 3 minutes)  
   FMVSS 301 Position Hold Time  
   Total  
   Next whole minute interval  

<table>
<thead>
<tr>
<th>Rollover Fixture 90° Rotation Time</th>
<th>1 minutes 30 seconds</th>
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<tr>
<td>FMVSS 301 Position Hold Time +</td>
<td>5 minutes 0 seconds</td>
</tr>
<tr>
<td>Total</td>
<td>6 minutes 30 seconds</td>
</tr>
<tr>
<td>Next whole minute interval</td>
<td>7 minutes</td>
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2. **FMVSS 301 Requirements:**

   (1) **Time Period**
   
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<th>6th min.</th>
<th>7th min.</th>
<th>8th min. (if required)</th>
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   (2) **Maximum Allowable Solvent Spillage**

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<tr>
<th>142 g</th>
<th>28 g</th>
<th>28 g</th>
<th>28 g</th>
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3. **Actual Test Vehicle Solvent Spillage:**

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<th>0 g</th>
<th>N/A</th>
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</table>

   Note: Record spillage for whole minute intervals only as determined above.

4. **Solvent Spillage Location(s):**

   None
Data Sheet 17 (Continued)

FMVSS 301 Rollover Data

Vehicle: 2007 Toyota Highlander SUV   NHTSA No.: C75104

180 - 270 Degrees

1. Determination of Solvent Collection Time Period:

   Rollover Fixture 90° Rotation Time  _______ minutes _______ seconds
   (Spec. Range = 1 to 3 minutes)

   FMVSS 301 Position Hold Time   + _______ minutes _______ seconds

   Total _______ minutes _______ seconds

   Next whole minute interval _______ minutes

2. FMVSS 301 Requirements:

   (1) Time Period
   First 5 minutes from onset of rotation  6th min.  7th min.  8th min. (if required)

   (2) Maximum Allowable Solvent Spillage
   _______ 142 g  _______ 28 g  _______ 28 g  _______ 28 g

3. Actual Test Vehicle Solvent Spillage:
   _______ 0 g  _______ 0 g  _______ 0 g  _______ N/A

   Note: Record spillage for whole minute intervals only as determined above.

4. Solvent Spillage Location(s):
   None
Data Sheet 17 (Continued)

FMVSS 301 Rollover Data

Vehicle: 2007 Toyota Highlander SUV

NHTSA No.: C75104

270 - 360 Degrees

1. Determination Of Solvent Collection Time Period:

Rollover Fixture 90° Rotation Time: 1 minutes 30 seconds
(Spec. Range = 1 to 3 minutes)
FMVSS 301 Position Hold Time: + 5 minutes 0 seconds
Total: 6 minutes 30 seconds
Next whole minute interval: 7 minutes

2. FMVSS 301 Requirements:

(1) Time Period
First 5 minutes from onset of rotation
6th min. 7th min. 8th min. (if required)

(2) Maximum Allowable Solvent Spillage

<table>
<thead>
<tr>
<th></th>
<th>142 g</th>
<th>28 g</th>
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<th>28 g</th>
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3. Actual Test Vehicle Solvent Spillage:

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<th></th>
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Note: Record spillage for whole minute intervals only as determined above.

4. Solvent Spillage Location(s):

None
Appendix A

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<td>Pre-Test Vehicle Recommended Tire Pressure Label View</td>
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<td>FMVSS 301 Rollover View at 180°</td>
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<td>FMVSS 301 Rollover View at 270°</td>
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<td>FMVSS 301 Rollover View at 360°</td>
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Figure A-21 Pre-Test Right Side View of Impactor Face
Figure A-25  Pre-Test Left Side View of Impactor
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Figure A-48  Pre-Test Left View of Front SID HIII and Door Clearance
Figure A-49  Post-Test Left View of Front SID HIII and Door Clearance
Figure A-51 Post-Test Left View of Rear SID HIII
Figure A-54  Post-Test Left View of Rear SID HIII and Door Clearance
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Figure A-56 Post-Test Interior of Front Door Showing SID HIII Impact Locations
Figure A-61  Post-Test Interior of Rear Panel Showing SID HIII Impact Locations
Figure A-72  Post-Test Secondary Impact Point View
Figure A-74  Post-Test Overhead view of MDB With Impactor Face in Position
### TIRE AND LOADING INFORMATION

**SEATING CAPACITY:** TOTAL 5  
**FRONT 2:** REAR 3  
The combined weight of occupants and cargo should never exceed 390 kg or 860 lb.

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*SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION.*

---

**COUSSIN GONFLABLE LATÉRAL SRS Avertissement**  
**NE PAS INSTALLER DE HOUSSE QUI NE SEI**  
**OBSERVER LES PRÉCAUTIONS CONCERNANT**  
**PROXIMITÉ DU PARE-SOLEIL.**  
**POUR DE PLUS AMPLES INFORMATIONS ET**  
**SRS-SEITEN-AIRBAG Achtung**  
**VOM HERSTELLER NICHT GEDECKT ZU SUBVERSIT**  
**DEN VORDEREN SITZEN ANGEBAUCHT WERDEN**  
**Die gleichen Vorsichtsmassnahmen für**  
**BESCHRIEBEN SOLLTEN BEACHTET WERDEN.**  
**SIEHE DAS BENUTZER-HANDBUCH FÜR WEITERE**
Appendix B

Data Plots
### Table of Data Plots

**Driver and Passenger Dummy Instrumentation Plots**

- **Acceleration Data - Filter Class 1000**
- **Integration Data - Filter Class 180**
- **Force Data - Filter Class 1000**
- **Moment Data - Filter Class 600**
- **Contact Data - Filter Class 1000**

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Integration Data - Filter Class 180
Force Data - Filter Class 1000
Moment Data - Filter Class 600
Contact Data - Filter Class 1000

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**Driver and Passenger Dummy Instrumentation Plots**

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Driver and Passenger Dummy Instrumentation Plots
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER HEAD X-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Min. Value
-21.06 g at 57.12 ms

Max. Value
2.99 g at 198.96 ms

Filter: CFC_1000
**Driver Head X-Axis Velocity**

- **Time [ms]**
- **Max. Value**
  - 0.00 m/s at 0.00 ms
- **Min. Value**
  - -7.42 m/s at 162.56 ms

**56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander**

**Customer:** NHTSA  
**Test Number:** C75104  
**Date:** 12/01/2006  
**Time:** 14:40
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

Driver Head Y-Axis Acceleration

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Min. Value
-2.53 g at 14.16 ms

Max. Value
19.56 g at 50.64 ms

Filter: CFC_1000
### 56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**Driver Head Y-Axis Velocity**

- **Customer:** NHTSA
- **Test Number:** C75104
- **Date:** 12/01/2006
- **Time:** 14:40
- **TRC Inc. Test Lab:** CTF
- **Test Number:** 061201

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**Filter:** CFC_180
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**Driver Head Z-Axis Acceleration**

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Min. Value
-6.46 g at 55.20 ms

Max. Value
17.84 g at 56.96 ms

Filter: CFC_1000
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

TRC Inc. Test Lab: CTF
Customer: NHTSA
Test Number: C75104
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Velocity [m/s]

Time [ms]

Min. Value
0.00 m/s at 11.84 ms

Max. Value
2.64 m/s at 310.00 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER HEAD RESULTANT ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
0.01 g at -19.44 ms

Max. Value
30.56 g at 57.04 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER NECK X-AXIS SHEAR FORCE

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
-481.04 N at 57.20 ms

Max. Value
53.20 N at 188.08 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER NECK Y-AXIS SHEAR FORCE

Customer: NHTSA
Test Number: C75104

11NECKUP00SHFOYA

TRC Inc. Test Lab: CTF
Test Number: 061201

Min. Value
-112.43 N at 89.28 ms

Max. Value
244.25 N at 51.84 ms

Filter: CFC_1000

Time [ms]
Force [N]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**DRIVER NECK Z-AXIS AXIAL FORCE**

*Customer: NHTSA*
*Test Number: C75104*

**11NECKUP00SHFOZA**

**TRC Inc. Test Lab: CTF**
*Test Number: 061201*

- **Filter:** CFC_1000
- **Min. Value:** -185.41 N at 60.32 ms
- **Max. Value:** 871.42 N at 56.96 ms

Date: 12/01/2006
Time: 14:40
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**TRC Inc. Test Lab: CTF**
**Test Number: 061201**

**Customer: NHTSA**
**Test Number: C75104**

**11NECKUP00SHMOXB**

**TRC Inc. Test Lab: CTF**
**Test Number: 061201**

**Date: 12/01/2006**
**Time: 14:40**

**Filter: CFC_600**

**Min. Value**
-27.83 Nm at 48.00 ms

**Max. Value**
2.63 Nm at 210.80 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**DRIVER NECK MOMENT ABOUT Y AXIS**

**Customer:** NHTSA  
**Test Number:** C75104

**TRC Inc. Test Lab:** CTF  
**Test Number:** 061201

**Date:** 12/01/2006  
**Time:** 14:40

**Filter:** CFC_600

**Min. Value:**  
-43.57 Nm at 57.28 ms

**Max. Value:**  
19.00 Nm at 77.28 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

Driver Neck Moment About Z Axis

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_600

Min. Value
-8.10 Nm at 232.00 ms

Max. Value
37.13 Nm at 72.64 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander
Neck Moment about the Occipital Condyle (NECK OM)

Customer: NHTSA
Test Number: C75104
Test Orientation = Side

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

NECKOM (11TMONUP00SHMOXX)

Filter Class: CFC_600
Moment [Nm]

[Max.] 2.87 Nm at 210.80 ms
[Min.] -28.60 Nm at 77.68 ms

Dummy: HIII/SID
Seating Position: Driver
Neck OM Source Code: Mx + (D*Fy)
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER UPPER RIB Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

11RIBSLU00SHACYA

TRC Inc. Test Lab: CTF
Test Number: 061201

Min. Value
-17.44 g at 147.36 ms

Max. Value
31.74 g at 54.72 ms

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER UPPER RIB Y-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
0.00 m/s at 0.00 ms

Max. Value
9.27 m/s at 170.88 ms

Velocity [m/s]

Time [ms]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

Driver Lower Rib Y-Axis Acceleration

Min. Value: -16.24 g at 147.36 ms
Max. Value: 36.59 g at 11.60 ms

Filter: CFC_1000

Time [ms]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER LOWER RIB Y-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Velocity [m/s]

Min. Value
0.00 m/s at 0.00 ms

Max. Value
8.60 m/s at 167.76 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER LOWER SPINE Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

11SPIN1200SHACYA

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
-2.96 g at 100.32 ms

Max. Value
32.83 g at 40.24 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER LOWER SPINE Y-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
0.00 m/s at 0.00 ms

Max. Value
8.46 m/s at 90.32 ms

Velocity [m/s]

Time [ms]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

Driver Pelvis Y-Axis Acceleration

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
-13.84 g at 57.28 ms

Max. Value
55.01 g at 37.04 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**DRIVER PELVIS Y-AXIS VELOCITY**

**Customer:** NHTSA
**Test Number:** C75104

**TRC Inc. Test Lab:** CTF
**Test Number:** 061201

**Date:** 12/01/2006
**Time:** 14:40

**Filter:** CFC_180

**Min. Value**
0.00 m/s at 0.00 ms

**Max. Value**
9.39 m/s at 52.80 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**LEFT REAR PASSENGER HEAD X-AXIS ACCELERATION**

Customer: NHTSA
Test Number: C75104

**14HEADCG00SHACXA**

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

**Min. Value**
-32.07 g at 73.20 ms

**Max. Value**
8.07 g at 176.56 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER HEAD X-AXIS VELOCITY

Velocity [m/s]

-5.0
-4.0
-3.0
-2.0
-1.0
0.0
1.0

Min. Value
-7.54 m/s at 106.08 ms

Max. Value
0.37 m/s at 40.24 ms

Filter: CFC_180

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER HEAD Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
-9.66 g at 100.48 ms

Max. Value
41.75 g at 67.28 ms

Time [ms]

Acceleration [g]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**LEFT REAR PASSENGER HEAD Y-AXIS VELOCITY**

- **Max. Value**: 7.93 m/s at 86.24 ms
- **Min. Value**: -0.49 m/s at 49.44 ms

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

**Filter**: CFC_180

**Min. Value**
-0.49 m/s at 49.44 ms

**Max. Value**
7.93 m/s at 86.24 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER HEAD Z-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

14HEADCG00SHACZA

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
-34.78 g at 65.20 ms

Max. Value
11.47 g at 47.20 ms

Time [ms]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER HEAD Z-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Min. Value
-4.17 m/s at 114.64 ms

Max. Value
1.40 m/s at 52.40 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER HEAD RESULTANT ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Min. Value
0.01 g at -20.00 ms

Max. Value
56.46 g at 66.64 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER NECK X-AXIS SHEAR FORCE

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

14NECKUP00SHFOXA

Force [N]

Filter: CFC_1000
Min. Value
-236.50 N at 72.00 ms
Max. Value
245.90 N at 59.92 ms

Time [ms]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER NECK Y-AXIS SHEAR FORCE

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value: -682.70 N at 49.12 ms
Max. Value: 231.96 N at 66.72 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER NECK Z-AXIS AXIAL FORCE

Customer: NHTSA
Test Number: C75104
TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

<table>
<thead>
<tr>
<th>Filter</th>
<th>Min. Value</th>
<th>Max. Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFC_1000</td>
<td>-772.10 N at 63.92 ms</td>
<td>433.33 N at 177.84 ms</td>
</tr>
</tbody>
</table>
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER NECK MOMENT ABOUT X AXIS

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_600
Min. Value: -104.93 Nm at 62.08 ms
Max. Value: 13.02 Nm at 152.80 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**LEFT REAR PASSENGER NECK MOMENT ABOUT Y AXIS**

**Customer:** NHTSA  
**Test Number:** C75104

**TRC Inc. Test Lab:** CTF  
**Test Number:** 061201

**Date:** 12/01/2006  
**Time:** 14:40

**Filter:** CFC_600

**Min. Value:**  
-55.32 Nm at 73.44 ms

**Max. Value:**  
5.53 Nm at 54.00 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER NECK MOMENT ABOUT Z AXIS

Customer: NHTSA
Test Number: C75104

14NECKUP00SHMOZB

TRC Inc. Test Lab: CTF
Test Number: 061201

Time [ms]

Max. Value
24.97 Nm at 78.48 ms

Min. Value
-16.04 Nm at 197.84 ms

Torque [Nm]

Filter: CFC_600

-10

0

10

20

30

-20

-10

0

10

20

30

Filter: CFC_600

Min. Value
-16.04 Nm at 197.84 ms

Max. Value
24.97 Nm at 78.48 ms

Time [ms]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander
Neck Moment about the Occipital Condyle (NECK OM)

Customer: NHTSA
Test Number: C75104
Test Orientation = Side

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Neck OM Source Code: Mx + (D*Fy)

Dummy: HIII/SID
Seating Position: Left Rear Passenger

[Max.] 13.53 Nm at 152.96 ms
[Min.] -102.12 Nm at 61.52 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER UPPER RIB Y-AXIS ACCELERATION

Min. Value
-12.72 g at 43.36 ms

Max. Value
71.55 g at 38.16 ms

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER UPPER RIB Y-AXIS VELOCITY

Customer: NHTSA
Test Number: 061201

TRC Inc. Test Lab: CTF
Test Number: C75104

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
0.00 m/s at 23.44 ms

Max. Value
11.15 m/s at 141.04 ms

Time [ms]
Velocity [m/s]

0.00 m/s at 23.44 ms
11.15 m/s at 141.04 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER LOWER RIB Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
-26.96 g at 87.28 ms

Max. Value
94.08 g at 38.08 ms
6/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**LEFT REAR PASSENGER LOWER RIB Y-AXIS VELOCITY**

**14RIBSLL00SHVEYC**

Customer: NHTSA
Test Number: C75104
TRC Inc. Test Lab: CTF
Test Number: 061201

Filter: CFC_180

<table>
<thead>
<tr>
<th>Time [ms]</th>
<th>Velocity [m/s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.00 m/s</td>
</tr>
<tr>
<td>156.88</td>
<td>10.94 m/s</td>
</tr>
</tbody>
</table>

Max. Value: 10.94 m/s at 156.88 ms
Min. Value: 0.00 m/s at 0.00 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER LOWER SPINE Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

14SPIN1200SHACYA

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
-9.12 g at 69.68 ms

Max. Value
58.23 g at 45.20 ms
**56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander**

**LEFT REAR PASSENGER LOWER SPINE Y-AXIS VELOCITY**

Customer: NHTSA  
Test Number: C75104

TRC Inc. Test Lab: CTF  
Test Number: 061201

Date: 12/01/2006  
Time: 14:40

**Graph**

- **Velocity [m/s]**
  - Min. Value: 0.00 m/s at 0.00 ms
  - Max. Value: 9.27 m/s at 59.76 ms

- **Filter**: CFC_180
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER PELVIS Y-AXIS ACCELERATION

56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER PELVIS Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
-10.78 g at 60.00 ms

Max. Value
87.44 g at 36.16 ms

Time [ms]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER PELVIS Y-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
0.00 m/s at 0.00 ms

Max. Value
10.34 m/s at 53.12 ms
Driver and Passenger Dummy Redundant Instrumentation Plots
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER HEAD X-AXIS REDUNDANT ACCELERATION

Min. Value
-21.45 g at 57.20 ms

Max. Value
2.99 g at 202.96 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

*DRIVER HEAD X-AXIS REDUNDANT VELOCITY*

**Velocity [m/s]**

Min. Value
-7.59 m/s at 162.56 ms

Max. Value
0.00 m/s at 3.84 ms

**Filter:** CFC_180

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

Customer: NHTSA
Test Number: C75104

Min. Value
-2.51 g at 14.16 ms

Max. Value
18.73 g at 47.52 ms

Filter: CFC_1000
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

TRC Inc. Test Lab: CTF
Test Number: 061201

Customer: NHTSA
Test Number: C75104

Time [ms]
Max. Value
5.86 m/s at 152.00 ms

Min. Value
-0.02 m/s at 20.00 ms

Filter: CFC_180

Date: 12/01/2006
Time: 14:40
6/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER HEAD Z-AXIS REDUNDANT ACCELERATION

Customer: NHTSA
Test Number: C75104

11HEADCGRDSHACZA

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40
Filter: CFC_1000

Min. Value
-6.49 g at 60.24 ms

Max. Value
17.29 g at 56.80 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER HEAD Z-AXIS REDUNDANT VELOCITY

Customer: NHTSA
Test Number: C75104

Min. Value
0.00 m/s at 12.08 ms

Max. Value
2.76 m/s at 310.00 ms

Filter: CFC_180

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER HEAD RESULTANT REDUNDANT ACCELERATION

Customer: NHTSA
Test Number: C75104

11HEADCGRDHACRA

Min. Value
0.02 g at -20.00 ms

Max. Value
30.34 g at 57.12 ms

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

Driver Upper Rib Y-Axis Redundant Acceleration

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
-16.56 g at 147.36 ms

Max. Value
33.46 g at 146.88 ms

Time [ms]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER UPPER RIB Y-AXIS REDUNDANT VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
0.00 m/s at 0.00 ms

Max. Value
8.90 m/s at 172.00 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER LOWER RIB Y-AXIS REDUNDANT ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Min. Value
-14.53 g at 13.44 ms

Max. Value
38.35 g at 11.52 ms

Filter: CFC_1000

Time [ms]
0 50 100 150 200 250 300 350

Min. Value
Max. Value
Acceleration [g]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER LOWER RIB Y-AXIS REDUNDANT VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
0.00 m/s at 0.00 ms

Max. Value
8.58 m/s at 167.92 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

Driver Lower Spine Y-Axis Redundant Acceleration

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40
Filter: CFC_1000

Min. Value
-3.15 g at 100.08 ms

Max. Value
32.36 g at 40.24 ms
Filter: CFC_180

**Min. Value**
0.00 m/s at 0.00 ms

**Max. Value**
8.32 m/s at 90.08 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
-32.39 g at 73.28 ms

Max. Value
7.93 g at 176.00 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER HEAD X-AXIS REDUNDANT VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Min. Value
-7.72 m/s at 106.08 ms

Max. Value
0.37 m/s at 40.16 ms
6/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER HEAD Y-AXIS REDUNDANT ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Min. Value
-9.51 g at 101.04 ms

Max. Value
40.93 g at 68.72 ms

Filter: CFC_1000
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER HEAD Y-AXIS REDUNDANT VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
-0.50 m/s at 49.44 ms

Max. Value
7.70 m/s at 86.16 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander
LEFT REAR PASSENGER HEAD Z-AXIS REDUNDANT ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
-34.56 g at 65.28 ms

Max. Value
11.83 g at 46.72 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER HEAD Z-AXIS REDUNDANT VELOCITY

Customer: NHTSA
Test Number: C75104

14HEADACGRDSHVEZC

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Velocity [m/s]

Min. Value
-4.13 m/s at 114.88 ms

Max. Value
1.42 m/s at 52.48 ms

Time [ms]

-50 0 50 100 150 200 250 300 350
-5 -4 -3 -2 -1 0 1 2
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER HEAD RESULTANT ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
0.01 g at -17.52 ms

Max. Value
56.35 g at 66.40 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER UPPER RIB Y-AXIS REDUNDANT ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
-14.78 g at 43.28 ms

Max. Value
69.40 g at 38.08 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER UPPER RIB Y-AXIS REDUNDANT VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Min. Value
0.00 m/s at 23.44 ms

Max. Value
11.36 m/s at 140.96 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER LOWER RIB Y-AXIS REDUNDANT ACCELERATION

Min. Value: -29.62 g at 87.20 ms
Max. Value: 93.78 g at 38.16 ms

Filter: CFC_1000

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER LOWER RIB Y-AXIS REDUNDANT VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

<table>
<thead>
<tr>
<th>Time [ms]</th>
<th>Min. Value</th>
<th>Max. Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.00 m/s</td>
<td>10.86 m/s</td>
</tr>
<tr>
<td>157.04</td>
<td>10.86 m/s</td>
<td>0.00 m/s</td>
</tr>
</tbody>
</table>
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER LOWER SPINE Y-AXIS REDUNDANT ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_1000

Min. Value
-9.07 g at 68.64 ms

Max. Value
56.47 g at 45.20 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**LEFT REAR PASSENGER LOWER SPINE Y-AXIS REDUNDANT VELOCITY**

- **Max. Value**: 8.96 m/s at 59.52 ms
- **Min. Value**: 0.00 m/s at 0.00 ms

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

**Filter**: CFC_180

Duration: 310 ms

**Min. Value**: 0.00 m/s at 0.00 ms
**Max. Value**: 8.96 m/s at 59.52 ms
Test Vehicle Instrumentation Plots
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT FRONT SEAT X-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

16SILBFR0000ACXD

Min. Value
-4.25 g at 8.32 ms

Max. Value
2.98 g at 55.84 ms

Time [ms]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT FRONT SEAT Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

16SILBFR0000ACYD

Min. Value
-2.31 g at 153.92 ms

Max. Value
25.90 g at 16.80 ms

Filter: CFC_60
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT FRONT SEAT Y-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

16SILBFR0000VEYC

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Velocity [m/s]

Min. Value
0.00 m/s at 1.44 ms

Max. Value
6.28 m/s at 109.68 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT FRONT SEAT Z-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

16SILBFR0000ACZD

TRC Inc. Test Lab: CTF
Test Number: 061201

Min. Value
-12.50 g at 19.28 ms

Max. Value
4.65 g at 67.28 ms

Filter: CFC_60

Date: 12/01/2006
Time: 14:40
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT FRONT SEAT Z-AXIS VELOCITY

Min. Value
-2.58 m/s at 55.36 ms

Max. Value
0.58 m/s at 245.28 ms

Filter: CFC_180

Date: 12/01/2006
Time: 14:40

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT FRONT SEAT RESULTANT ACCELERATION

Customer: NHTSA
Test Number: C75104

16SILBFR0000ACRD

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
0.01 g at -17.60 ms

Max. Value
26.52 g at 16.96 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT REAR SEAT X-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

16SILBRE0000ACXD

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Min. Value
-4.46 g at 10.16 ms

Max. Value
3.13 g at 55.52 ms

Filter: CFC_60
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT REAR SEAT X-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
-0.27 m/s at 16.40 ms

Max. Value
0.44 m/s at 70.40 ms

Velocity [m/s]

56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT REAR SEAT X-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
-0.27 m/s at 16.40 ms

Max. Value
0.44 m/s at 70.40 ms

Velocity [m/s]

56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT REAR SEAT X-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
-0.27 m/s at 16.40 ms

Max. Value
0.44 m/s at 70.40 ms

Velocity [m/s]

56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT REAR SEAT X-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
-0.27 m/s at 16.40 ms

Max. Value
0.44 m/s at 70.40 ms

Velocity [m/s]

56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT REAR SEAT X-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
-0.27 m/s at 16.40 ms

Max. Value
0.44 m/s at 70.40 ms

Velocity [m/s]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT REAR SEAT Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Acceleration [g]

Filter: CFC_60

Min. Value
-1.91 g at 245.60 ms

Max. Value
24.91 g at 16.56 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT REAR SEAT Y-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

16SILBRE0000VEYC

TRC Inc. Test Lab: CTF
Test Number: 061201

Min. Value
0.00 m/s at 1.12 ms

Max. Value
7.39 m/s at 75.36 ms

Filter: CFC_180
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT REAR SEAT Z-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-13.52 g at 19.04 ms

Max. Value
4.85 g at 65.76 ms

Acceleration [g]

-15
-12.5
-10
-7.5
-5
-2.5
0
2.5
5

Time [ms]

-50
0
50
100
150
200
250
300
350
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT REAR SEAT Z-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104
TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
-2.46 m/s at 59.28 ms

Max. Value
0.80 m/s at 246.08 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT SIDE SILL AT REAR SEAT RESULTANT ACCELERATION

Customer: NHTSA
Test Number: C75104

16SILBRE0000ACRD

TRC Inc. Test Lab: CTF
Test Number: 061201

Filter: CFC_60

Min. Value
0.02 g at -12.72 ms

Max. Value
25.69 g at 16.80 ms

Time [ms]

Acceleration [g]

0 5 10 15 20 25 30

-50 0 50 100 150 200 250 300 350
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

REAR FLOORPAN ABOVE AXLE X-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-12.81 g at 27.12 ms

Max. Value
7.40 g at 55.84 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

REAR FLOORPAN ABOVE AXLE X-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
-1.90 m/s at 52.72 ms

Max. Value
0.00 m/s at 2.48 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

REAR FLOORPAN ABOVE AXLE Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-3.89 g at 80.56 ms

Max. Value
24.34 g at 36.32 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander
REAR FLOORPAN ABOVE AXLE Y-AXIS VELOCITY

TRC Inc. Test Lab: CTF
Test Number: 061201

Customer: NHTSA
Test Number: C75104

18FORA000000VEYC

Filter: CFC_180
Min. Value
0.00 m/s at 3.92 ms
Max. Value
8.60 m/s at 74.72 ms

Date: 12/01/2006
Time: 14:40
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

REAR FLOORPAN ABOVE AXLE Z-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-13.05 g at 22.80 ms

Max. Value
16.60 g at 36.96 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

REAR FLOORPAN ABOVE AXLE Z-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

18FORA000000VEZC

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
-0.27 m/s at 34.64 ms

Max. Value
1.22 m/s at 310.00 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

REAR FLOORPAN ABOVE AXLE RESULTANT ACCELERATION

Customer: NHTSA
Test Number: C75104

18FORA000000ACRD

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
0.01 g at -10.48 ms

Max. Value
29.66 g at 36.88 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT SIDE SILL AT FRONT SEAT Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-1,052.18 g at 38.56 ms

Max. Value
87.54 g at 8.32 ms

See Data Acquisition Explanations
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT SIDE SILL AT FRONT SEAT Y-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

See Data Acquisition Explanations
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT SIDE SILL AT FRONT SEAT Y-AXIS DISPLACEMENT

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
-378.10 m at 310.00 ms

Max. Value
0.06 m at 34.56 ms

See Data Acquisition Explanations
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT SIDE SILL AT REAR SEAT Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

14SILBRE0000ACYD

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-29.35 g at 11.60 ms

Max. Value
45.14 g at 16.56 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT SIDE SILL AT REAR SEAT Y-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Filter: CFC_180

Min. Value
-0.94 m/s at 307.52 ms

Max. Value
1.99 m/s at 46.64 ms

Time [ms]
Min. Value
Max. Value
-50 0 50 100 150 200 250 300 350
-50 0 50 100 150 200 250 300 350
0 0.5 1 1.5 2
-1 -0.5 0 0.5 1 1.5 2
-1 -0.5 0 0.5 1 1.5 2

Date: 12/01/2006
Time: 14:40
Min. Value
0.00 m at 0.48 ms

Max. Value
0.19 m at 171.52 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT REAR OCCUPANT COMPARTMENT Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Min. Value
-2.01 g at 80.80 ms

Max. Value
25.84 g at 16.48 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

RIGHT REAR OCCUPANT COMPARTMENT Y-AXIS VELOCITY

Min. Value
0.00 m/s at 1.12 ms

Max. Value
7.71 m/s at 75.28 ms

Filter: CFC_180
6/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

Right Rear Occupant Compartment Y-Axis Displacement

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
0.00 m at 1.60 ms

Max. Value
1.92 m at 310.00 ms

Distance [m]
-0.25 0 0.25 0.5 0.75 1.0 1.25 1.5 1.75 2

Time [ms]
-50 0 50 100 150 200 250 300 350
11APILLO0000ACYD

Min. Value
-81.48 g at 18.80 ms

Max. Value
88.05 g at 10.88 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT LOWER A-POST Y-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Min. Value: 0.00 m/s at 0.24 ms
Max. Value: 8.49 m/s at 13.28 ms
**56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander**

**LEFT MIDDLE A-POST Y-AXIS ACCELERATION**

Customer: NHTSA  
Test Number: C75104  
TRC Inc. Test Lab: CTF  
Test Number: 061201

---

**11APILMI0000ACYD**

**Min. Value**  
-4.09 g at 22.08 ms  

**Max. Value**  
35.84 g at 8.00 ms  

---

Filter: CFC_60  

---

Date: 12/01/2006  
Time: 14:40
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT MIDDLE A-POST Y-AXIS VELOCITY

Max. Value
6.09 m/s at 228.00 ms

Min. Value
-0.01 m/s at 0.56 ms

Filter: CFC_180

Min. Value
-0.01 m/s at 0.56 ms

Max. Value
6.09 m/s at 228.00 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT LOWER B-POST Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

14BPILO0000ACYD

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-1,573.59 g at 29.76 ms

Max. Value
135.05 g at 7.04 ms

See Data Acquisition Explanations
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT LOWER B-POST Y-AXIS VELOCITY

See Data Acquisition Explanations
14BPILMI0000ACYD

Min. Value: -25.88 g at 28.00 ms
Max. Value: 107.87 g at 12.48 ms

Filter: CFC_60

See Data Acquisition Explanations
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT MIDDLE B-POST Y-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Velocity [m/s]

Min. Value
0.00 m/s at 0.40 ms

Max. Value
19.65 m/s at 229.52 ms

Filter: CFC_180

See Data Acquisition Explanations
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT FRONT SEAT TRACK Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

11SETRFR0000ACYD

Date: 12/01/2006
Time: 14:40

Acceleration [g]
Filter: CFC_60

Min. Value
-27.85 g at 18.48 ms

Max. Value
34.94 g at 10.88 ms

Time [ms]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT FRONT SEAT TRACK Y-AXIS VELOCITY

Min. Value
-0.21 m/s at 310.00 ms

Max. Value
2.76 m/s at 12.88 ms
6/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR SEAT TRACK Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-4.81 g at 18.48 ms

Max. Value
38.70 g at 14.24 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR SEAT TRACK Y-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
0.00 m/s at 0.00 ms

Max. Value
8.06 m/s at 77.04 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

VEHICLE CENTER OF GRAVITY X-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

10VEHCCG0000ACXD

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-23.03 g at 25.68 ms

Max. Value
15.94 g at 36.88 ms
Velocity [m/s]

Filter: CFC_180

Min. Value
-1.74 m/s at 55.12 ms

Max. Value
0.00 m/s at 2.96 ms

Time [ms]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

VEHICLE CENTER OF GRAVITY Y-AXIS ACCELERATION

User: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-43.06 g at 25.76 ms

Max. Value
66.90 g at 19.52 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

VEHICLE CENTER OF GRAVITY Y-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Velocity [m/s]

Min. Value
0.00 m/s at 6.08 ms

Max. Value
7.08 m/s at 50.08 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

VEHICLE CENTER OF GRAVITY Z-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

10VEHCCG0000ACZD

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-20.73 g at 41.60 ms

Max. Value
22.54 g at 29.44 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

VEHICLE CENTER OF GRAVITY Z-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

10VEHCCG0000VEZC

Filter: CFC_180
-0.75 m/s at 62.88 ms

Max. Value
1.28 m/s at 33.84 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Filter: CFC_60

Min. Value
0.01 g at -9.12 ms

Max. Value
67.29 g at 19.68 ms

10VEHCCG0000ACRD
MDB Instrumentation Plots
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

MDB CENTER OF GRAVITY X-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-24.68 g at 37.76 ms

Max. Value
3.44 g at 106.48 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

MDB CENTER OF GRAVITY X-AXIS VELOCITY

**Customer:** NHTSA  
**Test Number:** C75104

**TRC Inc. Test Lab:** CTF  
**Test Number:** 061201

**Date:** 12/01/2006  
**Time:** 14:40

**Filter:** CFC_180

**Min. Value:** 5.45 m/s at 90.48 ms  
**Max. Value:** 15.35 m/s at 0.80 ms

---

The graph depicts the center of gravity x-axis velocity over time, with the velocity expressed in meters per second (m/s). The graph shows a sharp decrease in velocity, indicating a sudden deceleration. The minimum velocity of 5.45 m/s was reached at 90.48 ms, while the maximum velocity of 15.35 m/s was achieved at 0.80 ms. This data is crucial for understanding the dynamics of the impact and can be used to evaluate the safety measures in place for such scenarios.
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

MDB CENTER OF GRAVITY Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

M0VEHCCG0000ACYD

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-9.62 g at 26.40 ms

Max. Value
3.62 g at 63.04 ms

Acceleration [g]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

MDB CENTER OF GRAVITY Y-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_180

Min. Value
3.63 m/s at 310.00 ms

Max. Value
7.84 m/s at 2.24 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

MDB CENTER OF GRAVITY Z-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104
TRC Inc. Test Lab: CTF
Test Number: 061201

Min. Value
-8.46 g at 19.52 ms

Max. Value
7.95 g at 11.28 ms

Filter: CFC_60
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

MDB CENTER OF GRAVITY Z-AXIS VELOCITY

56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

MDB CENTER OF GRAVITY Z-AXIS VELOCITY

Filter: CFC_180

Min. Value
-0.57 m/s at 190.00 ms

Max. Value
0.63 m/s at 66.72 ms

Time [ms]

0 50 100 150 200 250 300 350

0 0.25 0.5 0.75

Velocity [m/s]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

MDB CENTER OF GRAVITY RESULTANT ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

M0VEHCCG0000ACRD

Min. Value
0.05 g at -14.80 ms

Max. Value
25.27 g at 37.92 ms

Filter: CFC_60
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**MDB REAR X-AXIS ACCELERATION**

**Customer:** NHTSA  
**Test Number:** C75104

**M7FRAM000000ACXD**

- **Min. Value:** -24.80 g at 40.48 ms  
- **Max. Value:** 2.24 g at 128.80 ms

**Test Lab:** TRC Inc.  
**Test Number:** 061201

**Date:** 12/01/2006  
**Time:** 14:40

**Filter:** CFC_60

---

**Graph:**

- X-axis: Time [ms]  
- Y-axis: Acceleration [g]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

MDB REAR X-AXIS VELOCITY

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

- Filter: CFC_180

Min. Value
4.34 m/s at 77.44 ms

Max. Value
15.34 m/s at 0.00 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

MDB REAR Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: CFC_60

Min. Value
-2.58 g at 149.60 ms

Max. Value
4.76 g at 30.80 ms

Time [ms]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

M7FRAM000000VEYC

TRC Inc. Test Lab: CTF
Test Number: 061201
Customer: NHTSA
Test Number: C75104

MDB REAR Y-AXIS VELOCITY

Filter: CFC_180

Min. Value
7.82 m/s at 1.68 ms

Max. Value
9.41 m/s at 54.88 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

MDB RIGHT CONTACT SWITCH

Customer: NHTSA
Test Number: C75104
TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: Unfiltered

Min. Value
0.00 Logic at 0.16 ms

Max. Value
1.00 Logic at -20.00 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

MDB LEFT CONTACT SWITCH

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: Unfiltered

Min. Value
0.00 Logic at 1.36 ms

Max. Value
1.00 Logic at -20.00 ms
Driver and Passenger Dummy Instrumentation Plots
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER UPPER RIB Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Min. Value
-1.52 g at 7.52 ms

Max. Value
29.57 g at 55.60 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER LOWER RIB Y-AXIS ACCELERATION

<table>
<thead>
<tr>
<th>Filter: FIR_100</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
</tr>
<tr>
<td>11RIBSLL00SHACY1</td>
</tr>
</tbody>
</table>

Min. Value
-3.89 g at 94.96 ms

Max. Value
25.06 g at 46.88 ms

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Acceleration [g]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander
DRIVER LOWER SPINE Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

11SPIN1200SHACY1

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: FIR_100
Min. Value: -2.53 g at 100.00 ms
Max. Value: 31.12 g at 40.00 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER PELVIS Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40
Filter: FIR_100

Min. Value
-13.08 g at 59.36 ms

Max. Value
54.04 g at 37.52 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER UPPER RIB Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: FIR_100

Min. Value
-3.67 g at 182.48 ms

Max. Value
52.15 g at 49.36 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER LOWER RIB Y-AXIS ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: FIR_100

Min. Value: -4.28 g at 68.08 ms
Max. Value: 50.63 g at 50.00 ms
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER LOWER SPINE Y-AXIS ACCELERATION

Customer: NHTSA  
Test Number: C75104

14SPIN1200SHACY1

TRC Inc. Test Lab: CTF  
Test Number: 061201

Date: 12/01/2006  
Time: 14:40

Min. Value  
-7.97 g at 68.72 ms

Max. Value  
55.01 g at 45.60 ms

Filter: FIR_100
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**LEFT REAR PASSENGER PELVIS Y-AXIS ACCELERATION**

**Customer:** NHTSA  
**Test Number:** C75104  
**TRC Inc. Test Lab:** CTF  
**Test Number:** 061201  
**Date:** 12/01/2006  
**Time:** 14:40

- **Min. Value:** 
  - -10.06 g at 60.00 ms

- **Max. Value:** 
  - 85.12 g at 36.24 ms

**Filter:** FIR_100

---

-50 0 50 100 150 200 250 300 350  
-20 0 20 40 60 80 100  

**Time [ms]**

**Acceleration [g]**
Time [ms]  
Max. Value  
29.74 g at 55.60 ms  
Min. Value  
-2.35 g at 42.48 ms  

56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander  
DRIVER UPPER RIB Y-AXIS REDUNDANT ACCELERATION  

Customer: NHTSA  
Test Number: C75104  

TRC Inc. Test Lab: CTF  
Test Number: 061201  

Date: 12/01/2006  
Time: 14:40  
Filter: FIR_100  

Acceleration [g]  
Min. Value  
-2.35 g at 42.48 ms  
Max. Value  
29.74 g at 55.60 ms  

0 5 10 15 20 25 30  
-5 -10 -15 -20 -25 -30  

Time [ms]  
-50 0 50 100 150 200 250 300 350
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER LOWER RIB Y-AXIS REDUNDANT ACCELERATION

Customer: NHTSA
Test Number: C75104

11RIBSLLRESHACY1

TRC Inc. Test Lab: CTF
Test Number: 061201

Filter: FIR_100

Max. Value
25.03 g at 47.44 ms

Min. Value
-3.85 g at 94.96 ms

Date: 12/01/2006
Time: 14:40
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

DRIVER LOWER SPINE Y-AXIS REDUNDANT ACCELERATION

Customer: NHTSA
Test Number: C75104

11SPIN12RDSHACY1

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40

Filter: FIR_100

Min. Value
-2.55 g at 100.00 ms

Max. Value
30.77 g at 40.00 ms

Time [ms]
14RIBSLURESHACY1

Filter: FIR_100

Min. Value
-3.68 g at 182.48 ms

Max. Value
52.75 g at 49.44 ms

Time [ms]
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

LEFT REAR PASSENGER LOWER RIB Y-AXIS REDUNDANT ACCELERATION

Customer: NHTSA
Test Number: C75104

TRC Inc. Test Lab: CTF
Test Number: 061201

Date: 12/01/2006
Time: 14:40
Filter: FIR_100

Min. Value
-4.28 g at 68.08 ms

Max. Value
49.98 g at 49.44 ms

14RIBSLLRESHACY1

Acceleration [g]
50
40
30
20
10
0
-10

Time [ms]
-50
0
50
100
150
200
250
300
350

B.158
061201
56/28 kph 90 Degree Side Impact (MDB) into Left Side of 2007 Toyota Highlander

**Customer:** NHTSA
**Test Number:** C75104

**TRC Inc. Test Lab:** CTF
**Test Number:** 061201

**Date:** 12/01/2006
**Time:** 14:40

**Filter:** FIR_100

**Min. Value**
-7.97 g at 68.72 ms

**Max. Value**
53.51 g at 45.04 ms
Appendix C

SID HIII Configuration and Performance Verification Data
Summary
SID HIII Pre-Test and Post-Test Calibration
Configured For Left Side Impact

Date:  11/16/06-12/14/06  TRC Inc. Test Number:  S/N 055 & S/N 059
Laboratory Technician:  C. Hall & R. Stoner

<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>SID HIII 055 Pre-Test</th>
<th>SID HIII 055 Post-Test</th>
<th>SID HIII 055 Pre-Test</th>
<th>SID HIII 055 Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH - Seated Height (mm)</td>
<td>889-909</td>
<td>902</td>
<td>903</td>
<td>904</td>
<td>902</td>
</tr>
<tr>
<td>RH - Rib Height (mm)</td>
<td>502-520</td>
<td>508</td>
<td>505</td>
<td>514</td>
<td>512</td>
</tr>
<tr>
<td>HP - Hip Pivot Height (mm)</td>
<td>99 ref</td>
<td>99.1</td>
<td>99.1</td>
<td>99.1</td>
<td>99.1</td>
</tr>
<tr>
<td>KH - Knee Pivot from Back Line (mm)</td>
<td>511-526</td>
<td>520</td>
<td>521</td>
<td>522</td>
<td>520</td>
</tr>
<tr>
<td>KV - Knee Pivot to Floor (mm)</td>
<td>490-505</td>
<td>493</td>
<td>499</td>
<td>501</td>
<td>500</td>
</tr>
<tr>
<td>HW - Hip Width (mm)</td>
<td>356-391</td>
<td>374</td>
<td>359</td>
<td>360</td>
<td>363</td>
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</tbody>
</table>

Thorax Impacts

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
<th>SID HIII 055 Pre-Test</th>
<th>SID HIII 055 Post-Test</th>
<th>SID HIII 055 Pre-Test</th>
<th>SID HIII 055 Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°C)</td>
<td>18.9-25.5</td>
<td>21.3</td>
<td>21.0</td>
<td>21.0</td>
<td>20.9</td>
</tr>
<tr>
<td>Relative Humidity (%)</td>
<td>10-70</td>
<td>29</td>
<td>26</td>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td>Probe Speed (m/s)</td>
<td>4.27-4.33</td>
<td>4.302</td>
<td>4.287</td>
<td>4.287</td>
<td>4.288</td>
</tr>
<tr>
<td>Upper Rib (g’s)</td>
<td>37-46</td>
<td>44.7</td>
<td>44.5</td>
<td>42.6</td>
<td>44.0</td>
</tr>
<tr>
<td>Lower Rib (g’s)</td>
<td>37-46</td>
<td>43.7</td>
<td>43.5</td>
<td>41.1</td>
<td>41.9</td>
</tr>
<tr>
<td>Lower Spine (g’s)</td>
<td>15-22</td>
<td>20.8</td>
<td>20.4</td>
<td>19.4</td>
<td>19.9</td>
</tr>
</tbody>
</table>

Pelvis Impacts

<table>
<thead>
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<th>Parameter</th>
<th>Specification</th>
<th>SID HIII 055 Pre-Test</th>
<th>SID HIII 055 Post-Test</th>
<th>SID HIII 055 Pre-Test</th>
<th>SID HIII 055 Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°C)</td>
<td>18.9-25.5</td>
<td>20.9</td>
<td>21.3</td>
<td>21.0</td>
<td>20.9</td>
</tr>
<tr>
<td>Relative Humidity (%)</td>
<td>10-70</td>
<td>29</td>
<td>26</td>
<td>31</td>
<td>27</td>
</tr>
<tr>
<td>Probe Speed (m/s)</td>
<td>4.27-4.33</td>
<td>4.321</td>
<td>4.315</td>
<td>4.286</td>
<td>4.293</td>
</tr>
<tr>
<td>Pelvis (g’s)</td>
<td>40-60</td>
<td>55.4</td>
<td>55.8</td>
<td>43.2</td>
<td>43.9</td>
</tr>
</tbody>
</table>
Calibration Test Results

Pre-Test

SID HIII: 055

Configured for Left Side Impact

External Dimensions: The dummy passed all external dimension requirements.
Lateral Head Drop Test: The head passed all lateral drop test requirements.
Lateral Neck Test: The neck passed all impact test requirements.
Lateral Thorax Impact Test: The thorax passed all impact test requirements.
Lumbar Flexion Test: The dummy met the lumbar flexion test requirements.
Abdominal Compression Test: The abdomen met the compression test requirements.
Pelvis Impact Test: The lateral pelvis passed all impact test requirements.
Thoracic Shock Absorber Test: The thoracic shock absorber was tested on October 20, 2006 for a previous calibration series.
<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Dimension</th>
<th>Specification</th>
<th>Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seated Height</td>
<td>SH</td>
<td>889.0 - 909.3 mm</td>
<td>902 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Rib Height</td>
<td>RH</td>
<td>501.7 - 520.7 mm</td>
<td>508 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Hip Pivot Height</td>
<td>HP</td>
<td>99.1 REF mm</td>
<td>99.1 mm</td>
<td></td>
</tr>
<tr>
<td>Knee Pivot From Backbone</td>
<td>KH</td>
<td>510.5 - 525.8 mm</td>
<td>520 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Knee Pivot From Floor</td>
<td>KV</td>
<td>490.2 - 505.5 mm</td>
<td>493 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Hip Width</td>
<td>HW</td>
<td>355.6 - 391.2 mm</td>
<td>374 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Top Rib Width From C/L</td>
<td>RW-1</td>
<td>165.1 - 180.3 mm</td>
<td>171 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Bottom Rib Width From C/L</td>
<td>RW-2</td>
<td>165.1 - 180.3 mm</td>
<td>170 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Difference Between Top &amp; Bottom Rib Width from C/L</td>
<td>&lt;= 2.5 mm</td>
<td>1.0 mm</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Technician

Approved

TRC

C-4 061201
<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.6 °C</td>
<td>21.2 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>50 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Peak Head Resultant Acceleration</td>
<td>120 - 150 g</td>
<td>149.7 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Peak Head Longitudinal Acceleration</td>
<td>(-15) - 15 g</td>
<td>6.4 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Is Head Resultant Acceleration Curve</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Unimodal Within 15% of Peak?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

Technician

Approved

Specification Source: CFR49 Part 572 Subpart M with Polarity in accordance with J211
Transportation Research Center Inc.

Left Lateral Head Drop
SID-HIII Serial No. 055 Certification No. 24-1
Test Date: 11/16/2006

Head X-Axis Acceleration

Filter Class: CFC_1000
Max: 6.4 g at 2.3 ms
Min: -2.3 g at 3.4 ms

Head Y-Axis Acceleration

Filter Class: CFC_1000
Max: 105.0 g at 2.4 ms
Min: -1.8 g at 7.0 ms

Head Z-Axis Acceleration

Filter Class: CFC_1000
Max: 106.6 g at 2.4 ms
Min: -0.2 g at -1.0 ms

Head Resultant Acceleration

Filter Class: CFC_1000
Max: 149.7 g at 2.4 ms
Min: 0.0 g at -0.5 ms

Specification Source: CFR49 Part 572 Subpart M
with Polarity in accordance with J211
C-6 061201
<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>20.6 - 22.2 °C</td>
<td>21.3 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>48 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Velocity</td>
<td>(-6.89) - (-7.13) m/s</td>
<td>-7.090 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 10 ms</td>
<td>1.96 - 2.55 m/s</td>
<td>2.369 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 20 ms</td>
<td>4.12 - 5.10 m/s</td>
<td>4.692 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 30 ms</td>
<td>5.73 - 7.01 m/s</td>
<td>6.635 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 40 to 70 ms</td>
<td>6.27 - 7.64 m/s</td>
<td>7.173 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Total Head D-Plane Rotation</td>
<td>(-66) - (-82) °</td>
<td>-71.1 °</td>
<td>Yes</td>
</tr>
<tr>
<td>Total Head D-Plane Rotation Time to 0° after Peak Rotation</td>
<td>58 - 67 ms</td>
<td>61.2 ms</td>
<td>Yes</td>
</tr>
<tr>
<td>Total Neck Occipital Condyle Moment</td>
<td>73 - 88 N·m</td>
<td>82.4 N·m</td>
<td>Yes</td>
</tr>
<tr>
<td>Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment</td>
<td>49 - 64 ms</td>
<td>54.3 ms</td>
<td>Yes</td>
</tr>
<tr>
<td>Time from Peak Moment to Peak Rotation</td>
<td>2 - 16 ms</td>
<td>8.2 ms</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Test meets specifications.**

**Comments:**

---

**Technician**

![Signature]

**Approved**

![Signature]
Transportation Research Center Inc.

Left Lateral Neck
SID-HIII  Serial No. 055  Certification No. 24-1
Test Date: 11/16/2006

Pendulum Acceleration

Filter Class: CFC_180
Max: 29.1 g at 1.5 ms
Min: -2.9 g at 41.0 ms

Pendulum Integrated Velocity Change

Filter Class: CFC_180
Max: 7.2 m/s at 35.4 ms
Min: 0.0 m/s at 0.0 ms
Transportation Research Center Inc.
Left Lateral Neck
SID-HIII  Serial No. 055  Certification No. 24-1
Test Date: 11/16/2006

Pot Rotation at the Base of Neck

Filter Class: CFC_60
Max: 12.2° at 148.7 ms
Min: -26.5° at 58.5 ms

Head Rotation at Occipital Condyles

Filter Class: CFC_60
Max: 17.4° at 159.5 ms
Min: -44.9° at 54.2 ms

Total Head D-Plane Rotation

Filter Class: CFC_60
Max: 29.1° at 153.7 ms
Min: -71.1° at 55.8 ms

Specification Source: CFR49 Part 572 Subpart M
with Polarity in accordance with J211
11.16.2006 14:36:57 2967  C-9
061201
Transportation Research Center Inc.

Left Lateral Neck
SID-HIII  Serial No. 055  Certification No. 24-1
Test Date: 11/16/2006

Neck Force (Y)
Force [N]
-500
-250
0
250
500
750
1000
0 40 80 120 160 200
Time [ms]

Filter Class: CFC_1000
Max: 909.5 N at 51.9 ms
Min: -270.4 N at 145.0 ms

Neck Force (Y) Filtered for Total Neck Occipital Condyle Calculation
Force [N]
-500
-250
0
250
500
750
1000
0 40 80 120 160 200
Time [ms]

Filter Class: CFC_600
Max: 908.9 N at 52.8 ms
Min: -270.0 N at 145.6 ms

Neck Moment (X)
Torque [Nm]
-40
-20
0
20
40
60
80
0 40 80 120 160 200
Time [ms]

Filter Class: CFC_600
Max: 67.7 Nm at 47.4 ms
Min: -24.5 Nm at 9.1 ms

Total Neck Occipital Condyle Moment (X)
Torque [Nm]
-50
-25
0
25
50
75
100
0 40 80 120 160 200
Time [ms]

Filter Class: CFC_600
Max: 82.4 N·m at 47.5 ms
Min: -27.2 N·m at 146.5 ms

Specification Source: CFR49 Part 572 Subpart M
with Polarity in accordance with J211

C-10
Transportation Research Center Inc.
Left Lateral Thorax
SID-HIII  Serial No. 055  Certification No. 24-1
Test Date: 11/17/2006

<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.6 °C</td>
<td>21.3 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>29 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Impactor Velocity</td>
<td>4.27 - 4.33 m/s</td>
<td>4.302 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Upper Rib Lateral Acceleration</td>
<td>37 - 46 g</td>
<td>44.7 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Lower Rib Lateral Acceleration</td>
<td>37 - 46 g</td>
<td>43.7 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Lower Spine Lateral Acceleration</td>
<td>15 - 22 g</td>
<td>20.8 g</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

Technician

Approved

Specification Source: CFR49 Part 572 Subpart M
with Polarity in accordance with J211
Transportation Research Center Inc.

Left Lateral Thorax
SID-HIII  Serial No. 055  Certification No. 24-1
Test Date: 11/17/2006

Upper Rib Acceleration (Y)

Filter Class: FIR_100
Max: 44.7 g at 18.0 ms
Min: -17.0 g at 24.9 ms

Lower Rib Acceleration (Y)

Filter Class: FIR_100
Max: 43.7 g at 17.9 ms
Min: -17.0 g at 24.8 ms

Lower Spine Acceleration (Y)

Filter Class: FIR_100
Max: 20.8 g at 22.4 ms
Min: -4.8 g at 41.8 ms

Specification Source: CFR49 Part 572 Subpart M
with Polarity in accordance with J211
Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression
SID-HIII  Serial No. 055  Certification No. 22-1
Test Date: 10/20/2006

<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.5 °C</td>
<td>21.5 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>35 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Maximum Force at Test Velocity</td>
<td>849 - 1,137 N</td>
<td>927.2 N</td>
<td>Yes</td>
</tr>
<tr>
<td>Maximum Displacement at Test Velocity</td>
<td>30.19 - 35.17 mm</td>
<td>32.106 mm</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

- Actual Impactor Velocity (m/s): 3.064
- Damper Setting: 9.0

Technician

Signed: [Signature]

Approved

Signed: [Signature]

Specification Source: TP214D-07 Appendix A

C-13
Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. 055 Certification No. 22-1
Test Date: 10/20/2006

Shock Absorber Resistive Force

Filter Class: CFC_1000
Max: 927.2 N at 5.1 ms
Min: -10.9 N at -8.4 ms

Shock Absorber Displacement

Filter Class: CFC_1000
Max: 32.1 mm at 39.8 ms
Min: -0.0 mm at -4.9 ms

Specification Source: TP214D-07 Appendix A
**Test Parameter** | **Specification** | **Test Results** | **Pass**
---|---|---|---
Temperature | 18.9 - 25.5 °C | 20.9 °C | Yes
Relative Humidity | 10 - 70 % | 37 % | Yes
Maximum Force at Test Velocity | 1,744 - 2,108 N | 1,858.3 N | Yes
Maximum Displacement at Test Velocity | 31.69 - 37.24 mm | 34.677 mm | Yes

**Test meets specifications.**

**Comments:**

- Actual Impactor Velocity (m/s): 4.278
- Damper Setting: 9.0

---

**Technician**

[Signature]

**Approved**

[Signature]
Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression
SID-HIII  Serial No. 055  Certification No. 22-1
Test Date: 10/20/2006

**Shock Absorber Resistive Force**

- Force [N]
- Time [ms]

Filter Class: CFC_1000
Max: 1,858.3 N at 3.4 ms
Min: -8.9 N at -6.1 ms

**Shock Absorber Displacement**

- Distance [mm]
- Time [ms]

Filter Class: CFC_1000
Max: 34.7 mm at 32.6 ms
Min: -0.0 mm at -9.9 ms

Specification Source: TP214D-07 Appendix A
<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.5 °C</td>
<td>21.0 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>37 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Maximum Force at Test Velocity</td>
<td>3,732 - 4,424 N</td>
<td>4,361.1 N</td>
<td>Yes</td>
</tr>
<tr>
<td>Maximum Displacement at Test Velocity</td>
<td>33.36 - 39.56 mm</td>
<td>36.298 mm</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

Actual Impactor Velocity (m/s): 6.086

Damper Setting: 9.0
Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression
SID-HIII  Serial No. 055  Certification No. 22-2
Test Date: 10/20/2006

Shock Absorber Resistive Force

Filter Class: CFC_1000
Max: 4,361.1 N at 1.7 ms
Min: -1,203.7 N at 94.9 ms

Shock Absorber Displacement

Filter Class: CFC_1000
Max: 36.3 mm at 27.3 ms
Min: -0.6 mm at 96.3 ms

Specification Source: TP214D-07 Appendix A

C-18
### Test Parameter

<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.5 °C</td>
<td>20.9 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>29 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Impactor Velocity</td>
<td>4.27 - 4.33 m/s</td>
<td>4.321 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pelvis Lateral Acceleration</td>
<td>3 - 7 ms</td>
<td>5.7 ms</td>
<td>Yes</td>
</tr>
<tr>
<td>Duration above 20g</td>
<td>40 - 60 g</td>
<td>55.4 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Is Acceleration Curve Unimodal Above 20g?</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

Technician

Approved
Transportation Research Center Inc.

Left Lateral Pelvis
SID-HIII  Serial No. 055  Certification No. 24-1
Test Date: 11/17/2006

Pelvis Y-Axis Acceleration

Filter Class: FIR_100
Max: 55.4 g at 12.1 ms
Min: -8.3 g at 17.1 ms
## Test Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.5 °C</td>
<td>21.0 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>30 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Probe Force within Corridor</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Probe Velocity</td>
<td>6.35 - 8.89 mm/s</td>
<td>7.969 mm/s</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

---

Technician: [Signature]

Approved: [Signature]

Specification Source: CFR 49 Part 572 Subpart B with Polarity in accordance with J211
Transportation Research Center Inc.
Abdomen Compression
SID-HIII Serial No. 055 Certification No. 24-3
Test Date: 11/17/2006

Probe Force

Filter Class: CFC_600
Max: 796.7 N at 6.1 s
Min: 6.7 N at -0.8 s

Probe Displacement

Filter Class: CFC_180
Max: 49.0 mm at 7.6 s
Min: -6.2 mm at -0.8 s

Probe Force vs Displacement

Filter Class: CFC_600
Max: 796.7 N at 48.8 mm
Min: 6.7 N at -6.2 mm
TRANSPORTATION RESEARCH CENTER INC.

PART 572B LUMBAR FLEXION TEST

SID/III

CAL DATE: 17-Nov-06

TRC, INC.  TEST NO: LUFL-01  572M SN 055 TORSO FLEX CAL 24

<table>
<thead>
<tr>
<th>TEST PARAMETER</th>
<th>SPECIFICATION</th>
<th>TEST RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMPERATURE</td>
<td>18.9 – 25.6°C</td>
<td>21.4°C</td>
</tr>
<tr>
<td>RELATIVE HUMIDITY</td>
<td>10 – 70 %</td>
<td>27 %</td>
</tr>
<tr>
<td>FORCE AT 0 DEG. FLEXION</td>
<td>-27 – 27 N</td>
<td>0 N</td>
</tr>
<tr>
<td>FORCE AT 20 DEG OF FLEXION</td>
<td>98 – 151 N</td>
<td>107 N</td>
</tr>
<tr>
<td>FORCE AT 30 DEG OF FLEXION</td>
<td>151 – 205 N</td>
<td>155 N</td>
</tr>
<tr>
<td>FORCE AT 40 DEG OF FLEXION</td>
<td>205 – 258 N</td>
<td>208 N</td>
</tr>
<tr>
<td>NET RETURN ANGLE AFTER 3 MINUTES</td>
<td>&lt; 12 °</td>
<td>2.4 °</td>
</tr>
</tbody>
</table>

TEST MEETS SPECIFICATIONS

TECHNICIAN: [Signature]
Calibration Test Results

Pre-Test

SID HIII: 059

Configured for Left Side Impact

External Dimensions: The dummy passed all external dimension requirements.
Lateral Head Drop Test: The head passed all lateral drop test requirements.
Lateral Neck Test: The neck passed all impact test requirements.
Lateral Thorax Impact Test: The thorax passed all impact test requirements.
Lumbar Flexion Test: The dummy met the lumbar flexion test requirements.
Abdominal Compression Test: The abdomen met the compression test requirements.
Pelvis Impact Test: The lateral pelvis passed all impact test requirements.
Thoracic Shock Absorber Test: The thoracic shock absorber was tested on October 20, 2006 for a previous calibration series.
<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Dimension</th>
<th>Specification</th>
<th>Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seated Height</td>
<td>SH</td>
<td>889.0 - 909.3 mm</td>
<td>904 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Rib Height</td>
<td>RH</td>
<td>501.7 - 520.7 mm</td>
<td>514 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Hip Pivot Height</td>
<td>HP</td>
<td>99.1 REF mm</td>
<td>99.1 mm</td>
<td></td>
</tr>
<tr>
<td>Knee Pivot From Backline</td>
<td>KH</td>
<td>510.5 - 525.8 mm</td>
<td>522 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Knee Pivot From Floor</td>
<td>KV</td>
<td>490.2 - 505.5 mm</td>
<td>501 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Hip Width</td>
<td>HW</td>
<td>355.6 - 391.2 mm</td>
<td>360 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Top Rib Width From C\L</td>
<td>RW-1</td>
<td>165.1 - 180.3 mm</td>
<td>172 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Bottom Rib Width From C\L</td>
<td>RW-2</td>
<td>165.1 - 180.3 mm</td>
<td>172 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Difference Between Top &amp; Bottom Rib Width from C\L</td>
<td>&lt;= 2.5 mm</td>
<td>0.0 mm</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Technician

Approved

Ron Bernard

Ron Stones

TRC

C-25

061201
## Test Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.6 °C</td>
<td>20.9 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>49 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Peak Head Resultant Acceleration</td>
<td>120 - 150 g</td>
<td>146.1 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Peak Head Longitudinal Acceleration</td>
<td>(-15) - 15 g</td>
<td>-4.3 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Is Head Resultant Acceleration Curve</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Unimodal Within 15% of Peak?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

---

Technician: [Signature]

Approved: [Signature]
Head X-Axis Acceleration

Filter Class: CFC_1000
Max: 3.5 g at 5.5 ms
Min: -4.3 g at 2.6 ms

Head Y-Axis Acceleration

Filter Class: CFC_1000
Max: 100.0 g at 2.7 ms
Min: -5.5 g at 6.0 ms

Head Z-Axis Acceleration

Filter Class: CFC_1000
Max: 106.4 g at 2.7 ms
Min: -2.5 g at 7.8 ms

Head Resultant Acceleration

Filter Class: CFC_1000
Max: 146.1 g at 2.7 ms
Min: 0.0 g at -0.2 ms
## Test Parameter

<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>20.6 - 22.2 °C</td>
<td>20.9 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>51 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Velocity</td>
<td>(-6.89) - (-7.13) m/s</td>
<td>-7.044 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 10 ms</td>
<td>1.96 - 2.55 m/s</td>
<td>2.382 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 20 ms</td>
<td>4.12 - 5.10 m/s</td>
<td>4.743 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 30 ms</td>
<td>5.73 - 7.01 m/s</td>
<td>6.676 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 40 to 70 ms</td>
<td>6.27 - 7.64 m/s</td>
<td>7.157 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Total Head D-Plane Rotation</td>
<td>(-66) - (-82)°</td>
<td>-71.4°</td>
<td>Yes</td>
</tr>
<tr>
<td>Total Neck Occipital Condyle Moment</td>
<td>73 - 88 N·m</td>
<td>80.1 N·m</td>
<td>Yes</td>
</tr>
<tr>
<td>Time from Peak Moment to Peak Rotation</td>
<td>2 - 16 ms</td>
<td>9.8 ms</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Test meets specifications.**

**Comments:**

---

**Technician**

[Signature]

**Approved**

[Signature]

---

Specification Source: CFR49 Part 572 Subpart M with Polarity in accordance with J211

11.16.2006 13:26:46 2968

C-28 061201
Transportation Research Center Inc.

Left Lateral Neck
SID-HIII  Serial No. 059  Certification No. 19-1
Test Date: 11/16/2006

Pendulum Acceleration

Filter Class: CFC_180
Max: 30.5 g at 1.8 ms
Min: -3.8 g at 40.6 ms

Pendulum Integrated Velocity Change

Filter Class: CFC_180
Max: 7.2 m/s at 34.9 ms
Min: 0.0 m/s at 0.0 ms
Transportation Research Center Inc.
Left Lateral Neck
SID-HIII  Serial No. 059  Certification No. 19-1
Test Date: 11/16/2006

Filter Class: CFC_60
Max: 14.7 ° at 152.6 ms
Min: -28.1 ° at 58.8 ms

Filter Class: CFC_60
Max: 17.0 ° at 156.8 ms
Min: -43.6 ° at 52.5 ms

Filter Class: CFC_60
Max: 31.6 ° at 155.0 ms
Min: -71.4 ° at 57.8 ms
Transportation Research Center Inc.

Left Lateral Neck
SID-HIII  Serial No. 059  Certification No. 19-1
Test Date: 11/16/2006

Neck Force (Y)
Filter Class: CFC_1000
Max: 797.0 N at 54.0 ms
Min: -245.0 N at 144.5 ms

Neck Force (Y) Filtered for Total Neck Occipital Condyle Calculation
Filter Class: CFC_600
Max: 795.5 N at 54.0 ms
Min: -244.7 N at 144.6 ms

Neck Moment (X)
Filter Class: CFC_600
Max: 67.3 Nm at 47.8 ms
Min: -22.8 Nm at 11.3 ms

Total Neck Occipital Condyle Moment (X)
Filter Class: CFC_600
Max: 80.1 N-m at 48.0 ms
Min: -26.6 N-m at 146.8 ms
<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.6 °C</td>
<td>21.0 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>30 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Impactor Velocity</td>
<td>4.27 - 4.33 m/s</td>
<td>4.287 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Upper Rib Lateral Acceleration</td>
<td>37 - 46 g</td>
<td>42.6 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Lower Rib Lateral Acceleration</td>
<td>37 - 46 g</td>
<td>41.1 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Lower Spine Lateral Acceleration</td>
<td>15 - 22 g</td>
<td>19.4 g</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

Technician: [Signature]

Approved: [Signature]

Specification Source: CFR49 Part 572 Subpart M with Polarity in accordance with J211
Transportation Research Center Inc.
Left Lateral Thorax
SID-HIII  Serial No. 059  Certification No. 19-1
Test Date: 11/17/2006

Upper Rib Acceleration (Y)

Filter Class: FIR_100
Max: 42.6 g at 17.8 ms
Min: -16.5 g at 24.7 ms

Lower Rib Acceleration (Y)

Filter Class: FIR_100
Max: 41.1 g at 17.8 ms
Min: -17.1 g at 24.7 ms

Lower Spine Acceleration (Y)

Filter Class: FIR_100
Max: 19.4 g at 22.8 ms
Min: -5.0 g at 39.7 ms

Specification Source: CFR 49 Part 572 Subpart M
with Polarity in accordance with J211

11.17.2006 08:44:17 591

C-33

061201
Transportation Research Center Inc.
3.05 m/s Thoracic Shock Absorber Compression
SID-HIII  Serial No. 059  Certification No. 17-1
Test Date: 10/20/2006

<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.5 °C</td>
<td>21.4 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>37 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Maximum Force at Test Velocity</td>
<td>849 - 1,137 N</td>
<td>929.1 N</td>
<td>Yes</td>
</tr>
<tr>
<td>Maximum Displacement at Test Velocity</td>
<td>30.19 - 35.17 mm</td>
<td>30.962 mm</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

Actual Impactor Velocity (m/s): 3.064
Damper Setting: 5.5

Technician: [Signature]
Approved: [Signature]

Specification Source: TP214D-07 Appendix A

C-34
Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. 059 Certification No. 17-1
Test Date: 10/20/2006

Shock Absorber Resistive Force

Filter Class: CFC_1000
Max: 929.1 N at 6.1 ms
Min: -8.2 N at -7.8 ms

Shock Absorber Displacement

Filter Class: CFC_1000
Max: 31.0 mm at 34.9 ms
Min: -0.0 mm at -9.7 ms

Specification Source: TP214D-07 Appendix A
### Test Parameter

<table>
<thead>
<tr>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.5 °C</td>
<td>21.0 °C</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>38 %</td>
</tr>
<tr>
<td>Maximum Force at Test Velocity</td>
<td>1,744 - 2,108 N</td>
<td>1,859.9 N</td>
</tr>
<tr>
<td>Maximum Displacement at Test Velocity</td>
<td>31.69 - 37.24 mm</td>
<td>33.640 mm</td>
</tr>
</tbody>
</table>

Test meets specifications.

**Comments:**

- Actual Impactor Velocity (m/s): 4.278
- Damper Setting: 5.5

---

Technician: [Signature]

Approved: [Signature]
Transportation Research Center Inc.
4.27 m/s Thoracic Shock Absorber Compression
SID-HIIX Serial No. 059 Certification No. 17-1
Test Date: 10/20/2006

Shock Absorber Resistive Force

Filter Class: CFC_1000
Max: 1,859.9 N at 4.2 ms
Min: -6.4 N at -5.3 ms

Shock Absorber Displacement

Filter Class: CFC_1000
Max: 33.6 mm at 29.5 ms
Min: -0.0 mm at -8.6 ms

Specification Source: TP214D-07 Appendix A

C-37
<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
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</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.5 °C</td>
<td>21.4 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>36 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Maximum Force at Test Velocity</td>
<td>3,732 - 4,424 N</td>
<td>4,229.0 N</td>
<td>Yes</td>
</tr>
<tr>
<td>Maximum Displacement at Test Velocity</td>
<td>33.36 - 39.56 mm</td>
<td>37.024 mm</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

- Actual Impactor Velocity (m/s): 6.086
- Damper Setting: 5.5

Technician: [Signature]

Approved: [Signature]
Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression
SID-HIII  Serial No. 059  Certification No. 17-1
Test Date: 10/20/2006

Shock Absorber Resistive Force

Filter Class: CFC_1000
Max: 4,229.0 N at 3.1 ms
Min: -939.9 N at 90.4 ms

Shock Absorber Displacement

Filter Class: CFC_1000
Max: 37.0 mm at 28.1 ms
Min: -0.2 mm at 91.2 ms

Specification Source: TP214D-07 Appendix A

C-39
**Transportation Research Center Inc.**

Left Lateral Pelvis  
SID-HIII  Serial No. 059  Certification No. 19-1  
Test Date: 11/17/2006

<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.5 °C</td>
<td>21.0 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>31 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Impactor Velocity</td>
<td>4.27 - 4.33 m/s</td>
<td>4.286 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pelvis Lateral Acceleration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration above 20g</td>
<td>3 - 7 ms</td>
<td>6.4 ms</td>
<td>Yes</td>
</tr>
<tr>
<td>Pelvis Lateral Acceleration</td>
<td>40 - 60 g</td>
<td>43.2 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Is Acceleration Curve Unimodal Above 20g?</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

Technician

Approved

Specification Source: CFR49 Part 572 Subpart M with Polarity in accordance with J211  
C-40  
11.17.2006 08:55:45 624  
061201
Transportation Research Center Inc.
Left Lateral Pelvis
SID-HIII Serial No. 059 Certification No. 19-1
Test Date: 11/17/2006

Pelvis Y-Axis Acceleration

Filter Class: FIR_100
Max: 43.2 g at 8.9 ms
Min: -10.4 g at 20.2 ms
<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.5 °C</td>
<td>21.2 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>48 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Probe Force</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>within Corridor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probe Velocity</td>
<td>6.35 - 8.89 mm/s</td>
<td>8.071 mm/s</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Test meets specifications.**

**Comments:**

**Technician**

**Approved**
**TRANSPORTATION RESEARCH CENTER INC.**

**LUMBAR FLEXION TEST**

**SID PART 572B**

**CAL DATE: 17-Nov-06**

<table>
<thead>
<tr>
<th>TEST PARAMETER</th>
<th>SPECIFICATION</th>
<th>TEST RESULTS</th>
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</thead>
<tbody>
<tr>
<td>TEMPERATURE</td>
<td>18.9 – 25.6° C</td>
<td>21.4°C</td>
</tr>
<tr>
<td>RELATIVE HUMIDITY</td>
<td>10 – 70 %</td>
<td>27 %</td>
</tr>
<tr>
<td>FORCE AT 0 DEG. FLEXION</td>
<td>-27 – 27 N</td>
<td>0 N</td>
</tr>
<tr>
<td>FORCE AT 20 DEG OF FLEXION</td>
<td>98 – 151 N</td>
<td>125 N</td>
</tr>
<tr>
<td>FORCE AT 30 DEG OF FLEXION</td>
<td>151 – 205 N</td>
<td>160 N</td>
</tr>
<tr>
<td>FORCE AT 40 DEG OF FLEXION</td>
<td>205 – 258 N</td>
<td>208 N</td>
</tr>
<tr>
<td>NET RETURN ANGLE AFTER 3 MINUTES</td>
<td>&lt;12 °</td>
<td>9.0 °</td>
</tr>
</tbody>
</table>

**TEST MEETS SPECIFICATIONS**

**TECHNICIAN** [Signature]
Calibration Test Results

Post-Test

SID HIII: 055

Configured for Left Side Impact

External Dimensions: The dummy passed all external dimension requirements.
Lateral Head Drop Test: The head passed all lateral drop test requirements.
Lateral Neck Test: The neck passed all impact test requirements.
Lateral Thorax Impact Test: The thorax passed all impact test requirements.
Lumbar Flexion Test: The dummy met the lumbar flexion test requirements.
Abdominal Compression Test: The abdomen met the compression test requirements.
Pelvis Impact Test: The lateral pelvis passed all impact test requirements.
Thoracic Shock Absorber Test: The thoracic shock absorber was not tested at this time.
Transportation Research Center Inc.
SID/HIII Dummy
External Dimensions
Serial No. 055 Calibration No. 25

<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Dimension</th>
<th>Specification</th>
<th>Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seated Height</td>
<td>SH</td>
<td>889.0 - 909.3 mm</td>
<td>903 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Rib Height</td>
<td>RH</td>
<td>501.7 - 520.7 mm</td>
<td>505 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Hip Pivot Height</td>
<td>HP</td>
<td>99.1 REF mm</td>
<td>99.1 mm</td>
<td></td>
</tr>
<tr>
<td>Knee Pivot From Backline</td>
<td>KH</td>
<td>510.5 - 525.8 mm</td>
<td>521 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Knee Pivot From Floor</td>
<td>KV</td>
<td>490.2 - 505.5 mm</td>
<td>499 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Hip Width</td>
<td>HW</td>
<td>355.6 - 391.2 mm</td>
<td>359 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Top Rib Width From C\L</td>
<td>RW-1</td>
<td>165.1 - 180.3 mm</td>
<td>167.5 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Bottom Rib Width From C\L</td>
<td>RW-2</td>
<td>165.1 - 180.3 mm</td>
<td>168 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Difference Between Top &amp; Bottom Rib Width from C\L</td>
<td>&lt;= 2.5 mm</td>
<td>0.5 mm</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Technician  
[Signature]

Approved  
[Signature]
Transportation Research Center Inc.
Left Lateral Head Drop
SID-HIII Serial No. 055 Certification No. 25-1
Test Date: 12/4/2006

<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.6 °C</td>
<td>21.2 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>24 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Peak Head Resultant Acceleration</td>
<td>120 - 150 g</td>
<td>133.3 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Peak Head Longitudinal Acceleration</td>
<td>(-15) - 15 g</td>
<td>-5.8 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

Technician

Approved

Specification Source: CFR49 Part 572 Subpart M with Polarity in accordance with J211


C-47

061201
Head X-Axis Acceleration

Filter Class: CFC_1000
Max: 2.2 g at 1.8 ms
Min: -5.8 g at 3.3 ms

Head Y-Axis Acceleration

Filter Class: CFC_1000
Max: 108.0 g at 2.3 ms
Min: -1.1 g at 6.4 ms

Head Z-Axis Acceleration

Filter Class: CFC_1000
Max: 78.0 g at 2.3 ms
Min: -1.3 g at 9.8 ms

Head Resultant Acceleration

Filter Class: CFC_1000
Max: 133.3 g at 2.3 ms
Min: 0.0 g at -0.1 ms
### Test Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>20.6 - 22.2 °C</td>
<td>21.2 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>25 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Velocity</td>
<td>(-6.89) - (-7.13) m/s</td>
<td>-7.087 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 10 ms</td>
<td>1.96 - 2.55 m/s</td>
<td>2.371 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 20 ms</td>
<td>4.12 - 5.10 m/s</td>
<td>4.759 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 30 ms</td>
<td>5.73 - 7.01 m/s</td>
<td>6.688 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 40 to 70 ms</td>
<td>6.27 - 7.64 m/s</td>
<td>7.188 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Total Head D-Plane Rotation</td>
<td>(-66) - (-82) °</td>
<td>-70.6 °</td>
<td>Yes</td>
</tr>
<tr>
<td>Time to 0° after Peak Rotation</td>
<td>58 - 67 ms</td>
<td>59.4 ms</td>
<td>Yes</td>
</tr>
<tr>
<td>Total Neck Occipital Condyle Moment</td>
<td>73 - 88 N·m</td>
<td>83.4 N·m</td>
<td>Yes</td>
</tr>
<tr>
<td>Time to 0 N·m after Peak Moment</td>
<td>49 - 64 ms</td>
<td>53.7 ms</td>
<td>Yes</td>
</tr>
<tr>
<td>Time from Peak Moment to Peak Rotation</td>
<td>2 - 16 ms</td>
<td>9.4 ms</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Test meets specifications.**

**Comments:**

---

**Technician**

[Signature]

**Approved**

[Signature]

Specification Source: CFR49 Part 572 Subpart M with Polarity in accordance with J211

12.05.2006 07:38:21 2069

C-49
Transportation Research Center Inc.

Left Lateral Neck
SID-HIII  Serial No. 055  Certification No. 25-1
Test Date: 12/5/2006

Filter Class: CFC_180
Max: 29.6 g at 1.6 ms
Min: -2.6 g at 40.9 ms

Filter Class: CFC_180
Max: 7.2 m/s at 35.5 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: CPR49 Part 572 Subpart M
with Polarity in accordance with J211

12.05.2006 07:38:50 2969
C-50

061201
Transportation Research Center Inc.

Left Lateral Neck
SID-HIII  Serial No. 055  Certification No. 25-1
Test Date: 12/5/2006

Pot Rotation at the Base of Neck

Filter Class: CFC_60
Max: 11.8 ° at 144.8 ms
Min: -27.5 ° at 60.2 ms

Head Rotation at Occipital Condyles

Filter Class: CFC_60
Max: 16.8 ° at 153.4 ms
Min: -43.9 ° at 55.0 ms

Total Head D-Plane Rotation

Filter Class: CFC_60
Max: 28.3 ° at 151.4 ms
Min: -70.6 ° at 56.6 ms
Transportation Research Center Inc.
Left Lateral Neck
SID-HIII Serial No. 055 Certification No. 25-1
Test Date: 12/5/2006

Neck Force (Y)
Force [N]
0 250 500 750 1000
-250 0 -250
Time [ms]
0 40 80 120 160 200
Max: 945.1 N at 51.7 ms
Min: -255.7 N at 143.6 ms

Neck Force (Y) Filtered for Total Neck Occipital Condyle Calculation
Force [N]
0 250 500 750 1000
-250 0 -250
Time [ms]
0 40 80 120 160 200
Max: 942.5 N at 51.7 ms
Min: -255.4 N at 142.6 ms

Neck Moment (X)
Torque [Nm]
0 20 40 60 80
-20 0 -40
Time [ms]
0 40 80 120 160 200
Max: 67.5 Nm at 47.1 ms
Min: -23.8 Nm at 10.1 ms

Total Neck Occipital Condyle Moment (X)
Torque [Nm]
0 25 50 75 100
-25 0 -50
Time [ms]
0 40 80 120 160 200
Max: 83.4 N·m at 47.2 ms
Min: -26.6 N·m at 144.5 ms

Filter Class: CFC_1000
Filter Class: CFC_600
Filter Class: CFC_600
Filter Class: CFC_600
<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.6 °C</td>
<td>21.0 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>26 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Impactor Velocity</td>
<td>4.27 - 4.33 m/s</td>
<td>4.287 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Upper Rib Lateral Acceleration</td>
<td>37 - 46 g</td>
<td>44.5 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Lower Rib Lateral Acceleration</td>
<td>37 - 46 g</td>
<td>43.5 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Lower Spine Lateral Acceleration</td>
<td>15 - 22 g</td>
<td>20.4 g</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

Specification Source: CFR49 Part 572 Subpart M with Polarity in accordance with J211
<table>
<thead>
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<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
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<tr>
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<td>18.9 - 25.5 °C</td>
<td>21.3 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>26 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Impactor Velocity</td>
<td>4.27 - 4.33 m/s</td>
<td>4.315 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pelvis Lateral Acceleration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration above 20g</td>
<td>3 - 7 ms</td>
<td>5.6 ms</td>
<td>Yes</td>
</tr>
<tr>
<td>Pelvis Lateral Acceleration</td>
<td>40 - 60 g</td>
<td>55.8 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Is Acceleration Curve Unimodal</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Above 20g?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Test meets specifications.**

Comments:

Technician

[Signature]

Approved

[Signature]
Transportation Research Center Inc.

Left Lateral Pelvis
SID-HIII  Serial No. 055  Certification No. 25-1
Test Date: 12/5/2006

Pelvis Y-Axis Acceleration

Filter Class: FIR_100
Max: 55.8 g at 9.8 ms
Min: -8.1 g at 23.4 ms

Specification Source: CFR49 Part 572 Subpart M
with Polarity in accordance with J211
## Test Parameter

<table>
<thead>
<tr>
<th></th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
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<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.5 °C</td>
<td>20.9 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>26 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Probe Force within Corridor</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Probe Velocity</td>
<td>6.35 - 8.89 mm/s</td>
<td>8.003 mm/s</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

Technician

Approved

Specification Source: CFR-49 Part 572 Subpart B with Polarity in accordance with J211

C-57
Transportation Research Center Inc.
Abdomen Compression
SID-HIII Serial No. 055 Certification No. 25-2
Test Date: 12/5/2006

Probe Force

Filter Class: CFC_600
Max: 637.9 N at 5.8 s
Min: 5.2 N at -0.7 s

Probe Displacement

Filter Class: CFC_180
Max: 46.4 mm at 6.7 s
Min: -5.9 mm at -0.7 s

Probe Force vs Displacement

Filter Class: CFC_600
Max: 637.9 N at 46.3 mm
Min: 5.2 N at -5.9 mm

Specification Source: CFR49 Part 572 Subpart B
with Polarity in accordance with J211

12.05.2006 11:04:07 9294
C-58
061201
TRANSPORTATION RESEARCH CENTER INC.

PART 572B LUMBAR FLEXION TEST

SID/HIII

CAL DATE: 05-Dec-06

TRC, INC. TEST NO: LUFL-01 572M SN 055 TORSO FLEX CAL 25

<table>
<thead>
<tr>
<th>TEST PARAMETER</th>
<th>SPECIFICATION</th>
<th>TEST RESULTS</th>
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<tbody>
<tr>
<td>TEMPERATURE</td>
<td>18.9 – 25.6° C</td>
<td>21.2°C</td>
</tr>
<tr>
<td>RELATIVE HUMIDITY</td>
<td>10 – 70 %</td>
<td>27 %</td>
</tr>
<tr>
<td>FORCE AT 0 DEG. FLEXION</td>
<td>-27 – 27 N</td>
<td>0 N</td>
</tr>
<tr>
<td>FORCE AT 20 DEG OF FLEXION</td>
<td>98 – 151 N</td>
<td>133 N</td>
</tr>
<tr>
<td>FORCE AT 30 DEG OF FLEXION</td>
<td>151 – 205 N</td>
<td>204 N</td>
</tr>
<tr>
<td>FORCE AT 40 DEG OF FLEXION</td>
<td>205 – 258 N</td>
<td>244 N</td>
</tr>
<tr>
<td>NET RETURN ANGLE AFTER 3 MINUTES</td>
<td>&lt; 12°</td>
<td>5.0°</td>
</tr>
</tbody>
</table>

TEST MEETS SPECIFICATIONS

TECHNICIAN

[Signature]
Calibration Test Results

Post-Test

SID HIII: 059

Configured for Left Side Impact

External Dimensions: The dummy passed all external dimension requirements.
Lateral Head Drop Test: The head passed all lateral drop test requirements.
Lateral Neck Test: The neck passed all impact test requirements.
Lateral Thorax Impact Test: The thorax passed all impact test requirements.
Lumbar Flexion Test: The dummy met the lumbar flexion test requirements.
Abdominal Compression Test: The abdomen met the compression test requirements.
Pelvis Impact Test: The lateral pelvis passed all impact test requirements.
Thoracic Shock Absorber Test: The thoracic shock absorber was not tested at this time.
<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Dimension</th>
<th>Specification</th>
<th>Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seated Height</td>
<td>SH</td>
<td>889.0 - 909.3 mm</td>
<td>902 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Rib Height</td>
<td>RH</td>
<td>501.7 - 520.7 mm</td>
<td>512 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Hip Pivot Height</td>
<td>HP</td>
<td>99.1 REF mm</td>
<td>99.1 mm</td>
<td></td>
</tr>
<tr>
<td>Knee Pivot From Backline</td>
<td>KH</td>
<td>510.5 - 525.8 mm</td>
<td>520 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Knee Pivot From Floor</td>
<td>KV</td>
<td>490.2 - 505.5 mm</td>
<td>500 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Hip Width</td>
<td>HW</td>
<td>355.6 - 391.2 mm</td>
<td>363 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Top Rib Width From C\L</td>
<td>RW-1</td>
<td>165.1 - 180.3 mm</td>
<td>172 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Bottom Rib Width From C\L</td>
<td>RW-2</td>
<td>165.1 - 180.3 mm</td>
<td>172 mm</td>
<td>Yes</td>
</tr>
<tr>
<td>Difference Between Top &amp; Bottom</td>
<td></td>
<td>&lt;= 2.5 mm</td>
<td>0.0 mm</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Transportation Research Center Inc.
Left Lateral Head Drop
SID-HIII Serial No. 059 Certification No. 20-2
Test Date: 12/5/2006

<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.6 °C</td>
<td>21.1 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>26 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Peak Head Resultant Acceleration</td>
<td>120 - 150 g</td>
<td>144.4 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Peak Head Longitudinal Acceleration</td>
<td>(-15) - 15 g</td>
<td>-5.7 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

Technician

Approved

Specification Source: CFR49 Part 572 Subpart M with Polarity in accordance with J211

12.05.2006 07:28:25 606

C-62

061201
Transportation Research Center Inc.
Left Lateral Head Drop
SID-HIII  Serial No. 059  Certification No. 20-2
Test Date: 12/5/2006

Head X-Axis Acceleration

Filter Class: CFC_1000
Max: 4.8 g at 5.7 ms
Min: -5.7 g at 2.6 ms

Head Y-Axis Acceleration

Filter Class: CFC_1000
Max: 114.1 g at 2.6 ms
Min: -6.3 g at 5.9 ms

Head Z-Axis Acceleration

Filter Class: CFC_1000
Max: 88.6 g at 2.7 ms
Min: -0.8 g at 7.8 ms

Head Resultant Acceleration

Filter Class: CFC_1000
Max: 144.4 g at 2.6 ms
Min: 0.0 g at -0.5 ms

Specification Source: CFR49 Part 572 Subpart M
with Polarity in accordance with J211
C-63
<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>20.6 - 22.2 °C</td>
<td>21.4 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>25 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Velocity</td>
<td>(-6.89) - (-7.13) m/s</td>
<td>-7.096 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 10 ms</td>
<td>1.96 - 2.55 m/s</td>
<td>2.368 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 20 ms</td>
<td>4.12 - 5.10 m/s</td>
<td>4.719 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 30 ms</td>
<td>5.73 - 7.01 m/s</td>
<td>6.663 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pendulum Integrated Velocity Change at 40 to 70 ms</td>
<td>6.27 - 7.64 m/s</td>
<td>7.196 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Total Head D-Plane Rotation</td>
<td>(-66) - (-82) °</td>
<td>-69.6 °</td>
<td>Yes</td>
</tr>
<tr>
<td>Total Head D-Plane Rotation Time to 0° after Peak Rotation</td>
<td>58 - 67 ms</td>
<td>58.3 ms</td>
<td>Yes</td>
</tr>
<tr>
<td>Total Neck Occipital Condyle Moment</td>
<td>73 - 88 N·m</td>
<td>81.2 N·m</td>
<td>Yes</td>
</tr>
<tr>
<td>Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment</td>
<td>49 - 64 ms</td>
<td>52.9 ms</td>
<td>Yes</td>
</tr>
<tr>
<td>Time from Peak Moment to Peak Rotation</td>
<td>2 - 16 ms</td>
<td>8.1 ms</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

Technician: [Signature]

Approved: [Signature]

Specification Source: CFR49 Part 572 Subpart M
with Polarity in accordance with J211

C-64

12.05.2006 08:38:01 2966

061201
Transportation Research Center Inc.
Left Lateral Neck
SID-HIII  Serial No. 059  Certification No. 20-1
Test Date: 12/5/2006

Filter Class: CFC_180
Max: 30.6 g at 1.7 ms
Min: -2.7 g at 38.3 ms

Pendulum Acceleration

Filter Class: CFC_180
Max: 7.2 m/s at 35.6 ms
Min: 0.0 m/s at 0.0 ms

Pendulum Integrated Velocity Change

Specification Source: CFR-49 Part 572 Subpart M
with Polarity in accordance with J211
12.05.2006 08:38:36 2966
Transportation Research Center Inc.
Left Lateral Neck
SID-HIII Serial No. 059 Certification No. 20-1
Test Date: 12/5/2006

Pot Rotation at the Base of Neck

Filter Class: CFC_60
Max: 14.3° at 152.5 ms
Min: -27.7° at 58.6 ms

Head Rotation at Occipital Condyles

Filter Class: CFC_60
Max: 17.2° at 156.7 ms
Min: -42.1° at 56.0 ms

Total Head D-Plane Rotation

Filter Class: CFC_60
Max: 31.4° at 155.5 ms
Min: -69.6° at 57.2 ms

Specification Source: CFR-49 Part 572 Subpart M
with Polarity in accordance with J211

12.05.2006 08:38:38 2966

C-66

061201
Transportation Research Center Inc.

Left Lateral Neck
SID-HIII Serial No. 059 Certification No. 20-1
Test Date: 12/5/2006

Filter Class: CFC_1000
Max: 774.5 N at 53.1 ms
Min: -252.3 N at 144.8 ms

Filter Class: CFC_600
Max: 774.0 N at 53.0 ms
Min: -252.1 N at 144.9 ms

Filter Class: CFC_600
Max: 68.0 Nm at 49.0 ms
Min: -22.8 Nm at 11.3 ms

Filter Class: CFC_600
Max: 81.2 N·m at 49.1 ms
Min: -26.6 N·m at 144.2 ms

Specification Source: CFR-49 Part 572 Subpart M
with Polarity in accordance with J211
### Test Parameter

<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.6 °C</td>
<td>20.9 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>28 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Impactor Velocity</td>
<td>4.27 - 4.33 m/s</td>
<td>4.288 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Upper Rib Lateral Acceleration</td>
<td>37 - 46 g</td>
<td>44.0 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Lower Rib Lateral Acceleration</td>
<td>37 - 46 g</td>
<td>41.9 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Lower Spine Lateral Acceleration</td>
<td>15 - 22 g</td>
<td>19.9 g</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Test meets specifications.**

**Comments:**

---

**Technician**

[Signature]

---

**Approved**

[Signature]
Transportation Research Center Inc.

Left Lateral Thorax
SID-HIII  Serial No. 059  Certification No. 20-3
Test Date: 12/6/2006

Upper Rib Acceleration (Y)

Filter Class: FIR_100
Max: 44.0 g at 16.6 ms
Min: -16.5 g at 23.5 ms

Lower Rib Acceleration (Y)

Filter Class: FIR_100
Max: 41.0 g at 16.6 ms
Min: -18.0 g at 24.1 ms

Lower Spine Acceleration (Y)

Filter Class: FIR_100
Max: 19.9 g at 21.6 ms
Min: -4.3 g at 38.5 ms

Specification Source: CFR49 Part 572 Subpart M
with Polarity in accordance with J211

12.06.2006 08:14:02 600
C-69
Transportation Research Center Inc.  
Left Lateral Pelvis  
SID-HIII   Serial No. 059  Certification No. 20-1  
Test Date: 12/5/2006

<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.5 °C</td>
<td>20.9 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>27 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Impactor Velocity</td>
<td>4.27 - 4.33 m/s</td>
<td>4.293 m/s</td>
<td>Yes</td>
</tr>
<tr>
<td>Pelvis Lateral Acceleration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration above 20g</td>
<td>3 - 7 ms</td>
<td>6.6 ms</td>
<td>Yes</td>
</tr>
<tr>
<td>Pelvis Lateral Acceleration</td>
<td>40 - 60 g</td>
<td>43.9 g</td>
<td>Yes</td>
</tr>
<tr>
<td>Is Acceleration Curve Unimodal Above 20g?</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Test meets specifications.

Comments:

Technician  

Approved  

Specification Source: CFR49 Part 572 Subpart M  
with Polarity in accordance with J211
Transportation Research Center Inc.

Left Lateral Pelvis
SID-HIII  Serial No. 059  Certification No. 20-1
Test Date: 12/5/2006

Filter Class: FIR_100
Max: 43.9 g at 9.0 ms
Min: -12.0 g at 20.9 ms
### Test Parameter

<table>
<thead>
<tr>
<th>Test Parameter</th>
<th>Specification</th>
<th>Test Results</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>18.9 - 25.5 °C</td>
<td>21.0 °C</td>
<td>Yes</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>10 - 70 %</td>
<td>26 %</td>
<td>Yes</td>
</tr>
<tr>
<td>Probe Force within Corridor</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Probe Velocity</td>
<td>6.35 - 8.89 mm/s</td>
<td>8.066 mm/s</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Test meets specifications.**

**Comments:**

---

Technician: [Signature]

Approved: [Signature]

Specification Source: CFR49 Part 572 Subpart B with Polarity in accordance with J211

12.05.2006 10:17:07 7678
Transportation Research Center Inc.
Abdomen Compression
SID-HIII Serial No. 059 Certification No. 20-6
Test Date: 12/5/2006

Probe Force

Filter Class: CFC_600
Max: 685.3 N at 5.6 s
Min: 6.6 N at -0.6 s

Probe Displacement

Filter Class: CFC_180
Max: 45.2 mm at 7.3 s
Min: -4.9 mm at -0.6 s

Probe Force vs Displacement

Filter Class: CFC_600
Max: 685.3 N at 44.8 mm
Min: 6.6 N at -4.9 mm
TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 05-Dec-06

TRC, INC.  TEST NO: LUFL-01  572B SN 059 TORSO FLEX CAL 20

<table>
<thead>
<tr>
<th>TEST PARAMETER</th>
<th>SPECIFICATION</th>
<th>TEST RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMPERATURE</td>
<td>18.9 – 25.6°C</td>
<td>21.3°C</td>
</tr>
<tr>
<td>RELATIVE HUMIDITY</td>
<td>10 – 70 %</td>
<td>26 %</td>
</tr>
<tr>
<td>FORCE AT 0 DEG. FLEXION</td>
<td>-27 – 27 N</td>
<td>0 N</td>
</tr>
<tr>
<td>FORCE AT 20 DEG OF FLEXION</td>
<td>98 – 151 N</td>
<td>128 N</td>
</tr>
<tr>
<td>FORCE AT 30 DEG OF FLEXION</td>
<td>151 – 205 N</td>
<td>182 N</td>
</tr>
<tr>
<td>FORCE AT 40 DEG OF FLEXION</td>
<td>205 – 258 N</td>
<td>257 N</td>
</tr>
<tr>
<td>NET RETURN ANGLE AFTER 3 MINUTES</td>
<td>&lt; 12 °</td>
<td>6.0 °</td>
</tr>
</tbody>
</table>

TEST MEETS SPECIFICATIONS

TECHNICIAN  

[Signature]
TRANSPORTATION RESEARCH CENTER INC.  S I D or S I D/H I I I
Test Date:  12/01/06  Mfg.: ASTC
Type:  50%  Proj./Seg. No.:  20020455/ 3060  Walter D. Dudek
S/N: 055

Test Eng:  

---

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PRE-USE</th>
<th>POST-USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEAD:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skull Cap Bolts:</td>
<td>tight and no wires pinched</td>
<td>X</td>
</tr>
<tr>
<td>Head Skin Condition</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>* Neck Load Cell Cables:</td>
<td>secure, taped, and with strain relief</td>
<td>X</td>
</tr>
<tr>
<td>Accel. Cable Exit (left or right)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NECK:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rubber Condition and Separation From End Caps</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Condyle Pin, Set Screws</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>* Neck Cable Torque (10-14 in lb) Actual: 12</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>* Nodding Blocks Condition and Position (Post-test Joint Function)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>THORAX:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jacket &amp; Abdomen Condition</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Stacked Shoulder Foams and Bolts</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Rib Wrap Condition</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Rib Cage Spring and Support Assembly</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Rib Cage Bolts</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Damper Rear Attachment Ring, Pivot Pins, and Bracket</td>
<td>N/A</td>
<td>X</td>
</tr>
<tr>
<td>Location and Adjustment of Chest Pot Bracket and Collars</td>
<td>N/A</td>
<td>X</td>
</tr>
<tr>
<td>Chest Pot Rod End Nuts and Eyebolt</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Arm Foam Orientation/Condition</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Thorax/Lumbar Spine Bolts / Condition and Separation from End Caps</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Adjust rib cage position to full extension</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>PELVIS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iliac Crest Bone</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Flesh Condition</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Tightness and Alignment of H-Point Tool Insert</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Hips Range of Motion and 1-2g Adjustment (before calibration only)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Upper Femur Bolt Adjustment and Position</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>LEGS AND FEET:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knee Skins and Castings Condition</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Femur Load Cell Bolts</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Breakaway Femur Bolts - function</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Knee Joint Function and Range of Motion</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Leg Skin Condition and Position</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Ankle Range of Motion</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Foot Condition</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>OTHER:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleanliness</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Target Position</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Clothes and Shoes BLUE</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>One G Joint Adjustments</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Verify channel s against assembly and Check connectors (intact &amp; labeled)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>ATTACH TEMPERATURE LOGGER TO DUMMY / DOWNLOAD</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

* Items checked during calibration; these items need checked when the dummy is used without recalibration

Pre Test Inspection Completed By:  J. Clarridge  Date:  11/30/06

Post Test Inspection Completed By: J. Clarridge  Date:  12/04/06

TRC Inc. Form #QF824.i56, Baseline, 10/04/06  Controlled Quality System Form

C-75  061201
## TRANSPORTATION RESEARCH CENTER INC.

**Test Date:** 12/01/06  
**Type:** 50%  
**S/N:** 059  
**Mfg.:** ASTC  
**Proj./Seg. No.:** 20020455/3060  
**Test Eng.:** Walter D. Dudek

### Test Data

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PRE-USE</th>
<th>POST-USE</th>
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<td>Skull Cap Bolts: tight and no wires pinched</td>
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<td>Head Skin Condition</td>
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<td>* Neck Load Cell Cables: secure, taped, and with strain relief</td>
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<td>Accel. Cable Exit (left or right)</td>
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<td>Condyle Pin, Set Screws</td>
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<td>* Neck Cable Torque (10-14 in lb) Actual: 12</td>
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<td>* Nodding Blocks Condition and Position (Post-test Joint Function)</td>
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<td>Adjust rib cage position to full extension</td>
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<td>Upper Femur Bolt Adjustment and Position</td>
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<td>One G Joint Adjustments</td>
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<td>Verify channel s against assembly and Check connectors (intact &amp; labeled)</td>
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<tr>
<td>ATTACH TEMPERATURE LOGGER TO DUMMY / DOWNLOAD</td>
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* Items checked during calibration; these items need checked when the dummy is used without recalibration

**Pre Test Inspection Completed By:** J. Clarridge  
**Date:** 11/30/06

**Post Test Inspection Completed By:** J. Clarridge  
**Date:** 11/16/06

TRC Inc. Form #QF824.i56, Baseline, 10/04/06  
Controlled Quality System Form

C-76  
061201
Appendix D

Test Equipment List and Calibration Information
Sign Convention  
SAE J211 MAR95

Accelerometers:  
+X: Forward  
+Y: Rightward  
+Z: Downward

Potentiometers:  
+Chest longitudinal deflection: Outward  
+Chest lateral deflection: Rightward  
+Seat belt displacement: Outward  
+Seat belt extension: Elongation  
+Knee slider displacement: Distance between femur and tibia increased (in relation to a seated dummy)

Rotation potentiometers:  
+About the X-axis: Left foot-eversion  
Right foot-inversion  
+About the Y-axis: Left/right foot-dorsiflexion  
+About the Z-axis: Left foot-internal  
Right foot-external

Load cells:  
+Femur force: Tension  
+Seat belt force: Tension  
+Barrier force: Tension

Neck load cells:  
+X force: Head pushed rearward  
+Y force: Head pushed leftward  
+Z force: Head pulled upward (tension on neck)  
+X moment: Left ear rotating toward left shoulder  
+Y moment: Chin rotating toward chest  
+Z moment: Chin rotating toward left shoulder

Tibia load cells:  
+X force: Ankle forward, knee rearward  
+Y force: Ankle rightward, knee leftward  
+Z force: Tension  
+X moment: Bottom of tibia moving leftward  
+Y moment: Bottom of tibia moving rearward
Lumbar load cells:

+X force: Chest rearward, pelvis forward
+Y force: Chest leftward, pelvis rightward
+Z force: Chest upward, pelvis downward
+X moment: Left shoulder toward left hip
+Y moment: Sternum toward front of legs
+Z moment: Right shoulder forward, left shoulder rearward
## Frequency Response Classes

SAE J211 MAR95

### Typical Test Measurements

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<th>Channel Class</th>
<th>Description</th>
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<td>Component analysis</td>
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<td>Integration for velocity or displacement</td>
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<td>60</td>
<td>Barrier Face Forces</td>
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<td>Belt Restraint System Loads</td>
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<td>Head accelerations (linear and angular)</td>
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<td>Neck Forces</td>
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<td>Thorax Sternum accelerations</td>
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<td>Pelvis Forces</td>
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<tr>
<td>1000</td>
<td>Pelvis Moments</td>
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<td>Femur/Knee/Tibia/Ankle Accelerations</td>
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The direction column on the following sheets describes the transducer output as mounted and wired in the test location. The polarity column indicates whether a polarity change occurred during data acquisition to conform to J211 MAR95. See Report Sign Convention sheet for description of data output as presented in the report: occasionally channels have been adjusted in post-acquisition processing to conform to J211 MAR95.
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CERTIFICATE OF CONFORMITY

Certificate No. 29314
Serial No. GI319

Product Description
FMVSS 214 - 1750x740x550mm Spec with 1.6 3/8 5052 Painted Grey

Cellbond Part No. 70NHTSASIUS G

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Declaration

The above moving deformable barrier has been manufactured in accordance with the provisions of FMVSS 214.

Additional Information...
NHTSA / IIHS DEFORMABLE SIDE IMPACT BARRIER
ALUMINIUM HONEYCOMB CERTIFICATION
STATIC TEST RESULTS

MAIN BLOCK
Core: 1.6 3/8 5052

Required Crush Strength
42.5 PSI to 47.5 PSI

Test No: 19909-8

GR No: CHC13030076GI
Block No: N/A

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Seven out of the eight samples must fulfill the crush strength requirement in order to pass the block certification.

*Sample size and location as per R94.

RESULT: PASSED
NHTSA / IIHS DEFORMABLE SIDE IMPACT BARRIER
MAIN BLOCK

Honeycomb Type: 1.6 3/8 5052
Higher Acceptable Crush Strength Limit: 47.5 PSI
Lower Acceptable Crush Strength Limit: 42.5 PSI

Test No: 19909-8  GR No: CHC13030076Gi

| Section 1:     | 0.25 - 0.38 inch |
| Section 2:     | 0.38 - 0.52 inch |
| Section 3:     | 0.52 - 0.65 inch |
| Speed:         | 0.25 inch/min    |

Block No: N/A
NHTSA / IIHS DEFORMABLE SIDE IMPACT BARRIER
ALUMINIUM HONEYCOMB CERTIFICATION
STATIC TEST RESULTS

BUMPER
Core: 5.2 1/4 3003

Required Crush Strength
230 PSI to 260 PSI

Test No: 18619-8

GR No: CHC0509017GC
Block No: N/A

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Seven out of the eight samples must fulfil the crush strength requirement in order to pass the block certification

*Sample size and location as per R94.

RESULT: PASSED
NHTSA / IIHS DEFORMABLE SIDE IMPACT BARRIER
BUMPER

Honeycomb Type: 5.2 1/4 3003
Higher Acceptable Crush Strength Limit: 260 PSI
Lower Acceptable Crush Strength Limit: 230 PSI

Test No: 18619-8
GR No: CHC0509017GC
Section 1: 0.25 - 0.38 inch
Section 2: 0.38 - 0.52 inch
Section 3: 0.52 - 0.65 inch
Speed: 0.25 inch/min

SAMPLE 1
Zone1 Zone2 Zone3

SAMPLE 2
Zone1 Zone2 Zone3

SAMPLE 3
Zone1 Zone2 Zone3

SAMPLE 4
Zone1 Zone2 Zone3

SAMPLE 5
Zone1 Zone2 Zone3

SAMPLE 6
Zone1 Zone2 Zone3

SAMPLE 7
Zone1 Zone2 Zone3

SAMPLE 8
Zone1 Zone2 Zone3

D-18
061201