SAFETY COMPLIANCE TESTING FOR
FMVSS NO. 216
ROOF CRUSH RESISTANCE

HONDA OF AMERICA MFG., INC.
2004 HONDA ELEMENT, MPV
NHTSA NO. C45300

GENERAL TESTING LABORATORIES, INC.
1623 LEEDSTOWN ROAD
COLONIAL BEACH, VIRGINIA 22443

MAY 28, 2004
FINAL REPORT
PREPARED FOR
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW
ROOM 6111 (NVS-220)
WASHINGTON, D.C. 20590
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Prepared By: Delvic Merrick
Approved By: [Signature]
Approval Date: 5/26/04

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: Amanda Rescott
Acceptance Date: 6/2/04
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<td>Grant Farrand, Project Engineer</td>
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<tr>
<td>Debbie Messick, Project Manager</td>
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<td>National Highway Traffic Safety Admin. Enforcement</td>
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<td>Office of Vehicle Safety Compliance (NVS-220)</td>
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<tr>
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<tr>
<td>400 7th St., S.W. Washington, DC 20590</td>
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<tr>
<td>Telephone No. (202) 366-4946</td>
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Form DOT F 1700.7 (8-72)
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SECTION 1
PURPOSE OF COMPLIANCE TEST

1.0 PURPOSE OF COMPLIANCE TEST

A 2004 Honda Element MPV was subjected to Federal Motor Vehicle Safety Standard (FMVSS) No. 216 testing to determine if the vehicle was in compliance with the requirements of the standard. The purpose of this standard is to reduce deaths and injuries due to the crushing of the roof into the occupant compartment in rollover crashes.

1.1 The test vehicle was a 2004 Honda Element MPV. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 5J6YH26254L000085

B. NHTSA No.: C45300

C. Manufacturer: HONDA OF AMERICA MFG., INC.

D. Manufacture Date: 12/03

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 216 testing on May 17, 2004.
SECTION 2

COMPLIANCE TEST RESULTS SUMMARY

2.0 TEST RESULTS

All tests were conducted in accordance with NHTSA, Office of Vehicle Safety Compliance (OVSC) Laboratory Procedure, TP-216-05 and General Testing Laboratories Procedure, TP-216-05B with the following modifications requested by the COTR:

1) The vehicle was rigidly mounted in the test fixture by welding vertical supports to the vehicle jack points to prevent any vehicle movement. Chains were not used in an effort to reduce and/or eliminate "pre-stressing" of the vehicle due to the tightening of chains.

2) Dial gauges were placed at the vehicle corners and at the passenger door to track overall vehicle motion and the ability of the alternate tie-down procedure to restrict motion of the vehicle.

3) A 50th percentile male hybrid III ATD Dummy was placed in the driver's seat per the 208 test procedure with an electrical contact strip on its head and a mating contact strip on the headliner of the vehicle. This contact strip was monitored during the test to determine if the dummy head would contact the headliner.

4) Performed the roof crush test to a loading ram displacement of 230 mm.

The data for this portion of the test can be found on Data Sheet 6.

Based on the test performed, the 2004 Honda Element appears to meet the requirements of FMVSS 216.
SECTION 3

COMPLIANCE TEST DATA

3.0 TEST RESULTS

The following data sheets document the results of testing on the 2004 Honda Element.
VEH. MOD YR/MAKE/MODEL/BODY: 2004 HONDA ELEMENT MPV
VEH. NHTSA NO: C45300; VIN: 5J6YH28254L000085
VEH. BUILD DATE: 12/03; TEST DATE: MAY 17, 2004
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE, AMANDA PRESCOTT

A. VISUAL INSPECTION OF TEST VEHICLE

Upon receipt, inspect vehicle for completeness, function, and discrepancies or damage which might influence the testing.

RESULTS:

B. VEHICLE DATA

(1) Vehicle type as shown on certification label: MPV
(2) Vehicle UVW as recorded on Data Table 2: 1576.1 kg

C. STATIC LOAD TEST OF DRIVER SIDE OF ROOF

Minimum roof crush resistance required by FMVSS 216 for the vehicle tested:

MCCR as recorded on Data Table 2: 23,168 N

Maximum roof crush resistance measured during test was 69,389 N at 224.9 mm

PASS FAIL

X

D. POST TEST VISUAL INSPECTION

Roof metal is raised upward approximately 5° in center of roof and pushed down approximately over driver's head. Driver's roof rail has been flattened from "C" pillar forward to about center of the "A" pillar. Windshield and driver door glass are shattered.

RESULTS:

REMARKS:

RECORDED BY: [Signature] DATE: 05/17/04
APPROVED BY: [Signature]
DATA SHEET 2
FMVSS 216
RECEIVING INSPECTION

VEH. MOD YR/MAKE/MODEL/BODY: 2004 HONDA ELEMENT MPV
VEH. NHTSA NO: C45300; VIN: 5J6YH26254L000085
VEH. BUILD DATE: 12/03 ; TEST DATE: MAY 17, 2004.
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE, AMANDA PRESCOTT

Upon receipt, the vehicle will be examined visually for completeness, function, and damage. The roof and supporting structures such as the doors and windows should be checked for proper operation and any discrepancies which may influence the testing. The vehicle will be weighed and the minimum roof crush resistance determined.

RESULTS:

(1) Unloaded Vehicle Weight (UVW)

<table>
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<th>Weight (kg)</th>
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<td>Left Front</td>
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<tr>
<td>Right Front</td>
<td>429.1</td>
</tr>
<tr>
<td>Front Axle</td>
<td>881.8</td>
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<tr>
<td>Left Rear</td>
<td>370.6</td>
</tr>
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<td>Right Rear</td>
<td>343.8</td>
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<tr>
<td>Rear Axle</td>
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TOTAL UVW 1576.1 kg

(2) Vehicle type as shown on vehicle certification label: __ MPV __

(3) Minimum Roof Crush Resistance (MCRR):

Passenger Car:

\[ \text{UVW} \times 1.5 \times 8.8 = \text{N/A N} \]
MCRR = \text{N/A N} (UVW \times 1.5 \times 9.8 or 22,241 N whichever is less)

MPV, Truck or Bus:

MCRR = UVW \times 1.5 \times 9.8 = 23,168 N

(4) Other Comments:

REMARKS:

RECORDED BY: [Signature]
DATE: 05/17/04
APPROVED BY: [Signature]
DATA SHEET 3
FMVSS 216
PRE-TEST PREPARATION

VEH. MOD YR/MAKE/MODEL/BODY: 2004 HONDA ELEMENT MPV
VEH. NHTSA NO: C45300; VIN: 5J6YH28254L000085
VEH. BUILD DATE: 12/03; TEST DATE: MAY 17, 2004
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE, AMANDA PRESCOTT

Prior to testing, the following will be accomplished:

A. Secure any convertible top, movable or removable roof structure in their weather tight positions ________________ OK

B. Close all windows ________________ OK

C. Close and lock all doors ________________ OK

D. State Side of Roof Tested ________________ Driver

E. Measure the lateral angle of the test device at sufficient points to determine that it has a 25 degree (plus zero degree, minus one degree) angle ________________ 25°

F. Measure the longitudinal angle of the loading device at sufficient points to determine that it has a 5 degree (plus zero minutes, minus 20 minutes) ________________ 5°

G. The test device will initially contact the roof at 533 mm aft of windshield

H. If the test device was relocated based on the requirements of Chapter 12.3 paragraph F, describe where the test device will initially contact the roof as relocated ________________ N/A

I. Ambient temperature 51 mm from the vehicle roof in the immediate area of the test device: ________________ 25.6 degrees C.

REMARKS:

RECORDED BY: ___________________ DATE: ____________

APPROVED BY: ___________________
DATA SHEET 4
FMVSS 216

VEH. MOD YR/MAKE/MODEL/BODY: 2004 HONDA ELEMENT MPV
VEH. NHTSA NO: C45300; VIN: 5J6YH28254L000085
VEH. BUILD DATE: 12/03; TEST DATE: MAY 17, 2004
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE, AMANDA PRESCOTT

RESULTS: Plots of load versus displacement and time versus displacement showed that:

(1) The maximum roof crush resistance was 69,389 N at 224.9 mm
(2) The rate of loading was 5.08 mm/sec (.2 in/sec)
(3) The required roof crush resistance of 23,168 N was at 39.8 mm

REMARKS:

RECORDED BY: ___________________ DATE: 05/17/04
APPROVED BY: ___________________
DATA SHEET 5
FMVSS 216
POST TEST VISUAL INSPECTION

VEH. MOD YR/MAKE/MODEL/BODY: 2004 HONDA ELEMENT MPV
VEH. NHTSA NO: C45300; VIN: 5J6YH28254L000085
VEH. BUILD DATE: 12/03; TEST DATE: MAY 17, 2004
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE, AMANDA PRESCOTT

Upon completion of testing, a detailed visual inspection of the vehicle shall be made. Describe all damage and deformation that occurred during the test.

RESULTS: Roof metal is raised upward approximately 5" in center of roof and pushed down approximately 6" over driver's head. Driver's roof rail has been flattened from "C" pillar forward to about center of the "A" pillar. Windshield and driver door glass are shattered.

RECORDED BY: [Signature]

APPROVED BY: [Signature]

DATE: 05/17/04
DATA SHEET 6
FMVSS 216 MODIFIED PORTION POST TEST

VEH. MOD YR/MAKE/MODEL/BODY: 2004 HONDA ELEMENT MPV
VEH. NHTSA NO: C45300; VIN: 5J6YH28254L000085
VEH. BUILD DATE: 12/03; TEST DATE: MAY 17, 2004
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE, AMANDA PRESCOTT

Maximum Load Applied = 69,389 N @ 224.9 mm
Maximum Displacement = 225.8 mm @ 69,389 N

Left Front Dial Indicator Displacement = .51 mm
Right Front Dial Indicator Displacement = 3.3 mm
Left Rear Dial Indicator Displacement = 20.1 mm
Right Rear Dial Indicator Displacement = 27.7 mm
Right Door Sill Dial Indicator Displacement = 16.0 mm

NOTES:
Pre-Test dummy had 9.0 inches from top of head to headliner and 11.5 inches transverse from side of head to "B" pillar.
No contact between the dummy head and the vehicle headliner was observed during the test.

RECORDED BY: [Signature] DATE: 05/17/04
APPROVED BY: [Signature]
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SECTION 5

PHOTOGRAPHS
SECTION 6

TEST PLOTS
GTL 5198

216. Roof Crush, Driver Side.

Time in Seconds

Force in Newtons (Thousands)
GTL 519B

216. Roof Crush, Driver Side.

Displacement in Millimeters

Force in Newtons

(Thousands)
GTL 5198

216, Roof Crush, Driver Side.
GTL 5198

216, Roof Crush, Driver Side.

Time in Seconds

Plate Contact

0  2  4  6  8  10  12  14  16  18  20
0  2  4  6  8  10  12  14  16  18  20  22  24  26  28  30  32  34