SAFETY COMPLIANCE TESTING FOR
FMVSS NO. 301L
FUEL SYSTEM INTEGRITY

HYUNDAI MOTOR CO.
2003 HYUNDAI SANTA FE
NHTSA NO. C30508

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

JUNE 26, 2003
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: 

Approved By: 

Approval Date: 6/26/03

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: 

Acceptance Date: 7/24/03
Compliance tests were conducted on the subject, 2003 Hyundai Santa Fe MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301-02 for the determination of FMVSS 301 compliance. Test failures identified were as follows:

**NONE**
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SECTION 1
PURPOSE OF COMPLIANCE TEST

1.0 PURPOSE OF COMPLIANCE TEST

A 2003 Hyundai Santa Fe MPV was subjected to Federal Motor Vehicle Safety Standard (FMVSS) No. 301 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 occurring from fires that result from fuel spillage during and after motor vehicle crashes, and resulting from ingestion of fuels during siphoning.

1.1 The test vehicle was a 2003 Hyundai Santa Fe MPV. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: KM8SB12B83U411971

B. NHTSA No.: C30508

C. Manufacturer: HYUNDAI MOTOR CO.

D. Manufacture Date: 11/02

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 301 testing on May 28, 2003.
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-301-02 dated 8 November 1994 and General Testing Laboratories, Inc. (GTL) Test Procedure, TP-301-02, "Fuel System Integrity".

Based on the test performed, the 2003 Hyundai Santa Fe MPV appears to meet the lateral impact requirements of FMVSS 301 testing.
SECTION 3

COMPLIANCE TEST DATA

3.0 TEST RESULTS

The following data sheets document the results of testing on the 2003 Hyundai Santa Fe MPV.
SUMMARY OF RESULTS

Vehicle’s NHTSA No.: C30508  Test Model: SANTA FE

Test Date.: 05/28/03  Time: 15:50  Temperature 71 °F

Vehicle Model Year, Make, Model and Body Style:
2003 HYUNDAI SANTA FE MPV

Vehicle Test Weight: 4089 lbs.; Impact Velocity: 19.6 mph

Type of Front Occupant Restraint System Installed in Test Vehicle:

Driver’s DSP: TYPE 2 BELT WITH FRONTAL AIR BAG IN STEERING WHEEL
Side Air Bag
Right Passenger’s DSP: TYPE 2 BELT WITH FRONTAL AIR BAG IN DASH,
Side Air Bag

Stoddard solvent spilage from Vehicle’s Fuel System: None

REMARKS: THE DRIVER SIDE AIR BAG DEPLOYED

RECORDED BY:  DATE: 05/29/03
APPROVED BY:  

[Signatures]
DATA SHEET 1
TEST VEHICLE SPECIFICATIONS

TEST VEHICLE INFORMATION:

NHTSA No.: C30508
Year/Make/Model/Body Style: 2003 HYUNDAI SANTA FE MPV
Engine Data: 4 CYLINDER INLINE DOHC 2.4 LITERS
Transmission Data: 5 SPEED MANUAL
Final Drive Data: 4 WHEEL DRIVE
Major Options: UTILITY PACKAGE
Date Received: 03/06/03 Odometer Reading: 96 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: HYUNDAI MOTOR CO.
Date of Manufacture: 11/02
VIN: KM8SB12B83U411971
GVWR: 2208 kg (4870 lbs.); GAWR Front: 1199 kg (2645 lbs.) GAWR Rear: 1299 kg (2865 lbs.)

DATA FROM VEHICLE'S TIRE PLACARD:

Location of Placard on Vehicle: DRIVER'S "B" PILLAR
Tire Pressure With Maximum Capacity Vehicle Load:
Front: 32 psi; Rear: 32 psi
Recommended Tire Size: P225/70R16
Recommended Cold Tire Pressure: Front = 220 kPa (32 psi) Rear = 220 kPa (32 psi)
Size of Tires on Test Vehicle: P225/70R16
Type of Spare Tire: FULL SIZE

Vehicle Capacity Data:

Type of Front Seat(s): BUCKET
Number of Occupants: Front = 2; Mid = ; Rear = 3; Total = 5

A. VEHICLE CAPACITY WEIGHT (VCW) = 880 lbs.
B. Number of Occupants x 150 lbs. = 750 lbs.
RATED CARGO AND LUGGAGE WEIGHT (RCLW) = A - B = 130 lbs.

RECORDED BY: D. M. Date: 05/27/03
APPROVED BY: D. M. Date: 05/27/03
DATA SHEET 2
PRE-TEST DATA

WEIGHT OF TEST VEHICLE:

A. As Received At Laboratory (Maximum Fluids) —
   Right Front = 478.9 kg (1056 lbs.)  Right Rear = 350.1 kg (772 lbs.)
   Left Front = 491.6 kg (1084 lbs.)  Left Rear = 334.2 kg (737 lbs.)
   TOTAL FRONT = 970.6 kg (2140 lbs.)  TOTAL REAR = 684.4 kg (1509 lbs.)
   % of TOTAL = __59__ %  % of TOTAL = __41__ %
   TOTAL DELIVERED WEIGHT = __1655.1__ kg (3649 lbs.)

B. Calculation of Target Test Weight —
   1. Total Delivered Weight = __1655.1__ kg (3649 lbs.)
   2. Rated Cargo & Lugg. Weight (RCLW) = __59.0__ kg (130 lbs.)
   3. Weight of 2 Dummies (164 lbs. each) = __148.8__ kg (328 lbs.)
   TARGET TEST WEIGHT = 1 + 2 + 3 = __186.3__ kg (4107 lbs.)

C. Vehicle, Dummies and __63.50__ kg (140 lbs.) of Cargo Weight —
   Right Front = 538.41 kg (1187 lbs.)  Right Rear = 394.62 kg (870 lbs.)
   Left Front = 506.20 kg (1116 lbs.)  Left Rear = 415.49 kg (916 lbs.)
   TOTAL FRONT = 1044.62 kg (2303 lbs.)  TOTAL REAR = 810.11 kg (1786 lbs.)
   % of TOTAL = __56__ %  % of TOTAL = __44__ %
   TOTAL TEST WEIGHT = __1854.73__ kg (4089 lbs.)

Weight of Ballast secured in cargo area = __63.50__ kg (140 lbs)
Type of Ballast: SAND BAGS
Method of Securing Ballast: PASSENGER SEAT BELTS
Vehicle Components Removed for Weight Reduction:
   NONE
DATA SHEET 2
PRE-TEST DATA CONTINUED

TEST VEHICLE ATTITUDE:

As Delivered —
Right Front: 818 mm (32.2 inches)
Left Front: 813 mm (32.0 inches)
Right Rear: 846 mm (33.3 inches)
Left Rear: 838 mm (33.0 inches)

As Tested —
Right Front: 803 mm (31.6 inches)
Left Front: 805 mm (31.7 inches)
Right Rear: 820 mm (32.3 inches)
Left Rear: 805 mm (31.7 inches)

Vehicle's Wheelbase = 2620 mm (103.1 inches)

FUEL SYSTEM DATA:

Fuel System Capacity Listed in Owner's Manual = 65 liters (17.2 gallons)
Usable Capacity Figure Furnished By COTR = 65 liters (17.2 gallons)

Test Volume Range (91 to 94% of Usable Capacity) — 92.5%

59.4 liters (15.7 gallons) TO 61.3 liters (18.2 gallons)

ACTUAL TEST VOLUME = 60.2 liters (15.9 gallons) (with entire fuel system filled)

Test Fluid Type: Stoddard solvent
Test Fluid Specific Gravity: 0.7583
Test Fluid Kinematic Viscosity: 1.7 centistokes at 77°F
Test Fluid Color: BLUE ("red" is preferred)
Type of Vehicle Fuel Pump: ELECTRIC
Electric Fuel Pump Operation with Ignition Switch ON and Engine OFF — YES

Details of Fuel System: ELECTRIC PUMP SUPPLYING FUEL INJECTORS
FUEL RAIL WITH LOW PRESSURE RETURN LINE TO FUEL TANK.

REMARKS:

RECORDED BY: [Signature] DATE: 05/27/03
APPROVED BY: [Signature]
DATA SHEET 3
POST IMPACT DATA

TYPE OF TEST: 301L
TEST DATE: 05/28/03; TIME: 15:50; TEMP.: 71 °F
VEH. NHTSA NO.: C30508_...; VIN: KM8SB12B63U411971...

REQUIRED IMPACT VELOCITY RANGE: 18.9 ___ to ___18.9____ mph

ACTUAL IMPACT VELOCITY: (speed traps located within 5 feet of impact plane)

Trap No. 1 = 19.65 mph
Trap No. 2 = 19.60 mph
Average Impact Speed = 19.6 mph

REMARKS:

RECORDED BY: _______________ DATE: __05/28/02__
APPROVED BY: _______________
DATA SHEET 4
SUMMARY OF FMVSS 301 DATA

TEST VEHICLE NHTSA NO.: C30508; TEST DATE: 05/28/03

VEHICLE YEAR/MAKE/MODEL/BODY STYLE:
2003 HYUNDAI SANTA FE

TYPE OF IMPACT: 301L

STODDARD SOLVENT SPILLAGE MEASUREMENT:

A. From impact until vehicle motion ceases —
   Actual = 0 oz. Maximum Allowable = 1 ounce

B. For 5 minute period after vehicle motion ceases —
   Actual = 0 oz. Maximum Allowable = 5 ounces

C. For next 25 minutes —
   Actual = 0 oz. Maximum Allowable = 1 oz./minute

D. Provide Spillage Details: NONE

REMARKS:

RECORDED BY: [Signature] DATE: 05/28/03
APPROVED BY: [Signature]
A. Test Phase = 0° to 90°

Determination of Stoddard Solvent Collection Time Period:

1. Rollover Fixture 90° Rotation Time = 1 minute, 35 seconds

(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = 6 minutes, 35 seconds

4. NEXT WHOLE MINUTE INTERVAL = 7 minutes

Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = 0 oz.
   (5 oz. allowed)

2. 6th minute = 0 oz.
   (1 oz. allowed)

3. 7th minute = 0 oz.
   (1 oz. allowed)

4. 8th minute (if required) = N/A oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations — NONE
DATA SHEET 5 CONTINUED

B. Test Phase = 90° to 180°

Determination of Stoddard Solvent Collection Time Period:

1. Rollover Fixture 90°
   Rotation Time = 1_... minutes, _33_ seconds

(Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold
   Time = 5 minutes, 0 seconds

3. TOTAL = 6_... minutes, _33_ seconds

4. NEXT WHOLE MINUTE INTERVAL = _7_ minutes

Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = _0_... oz.
   (5 oz. allowed)

2. 6th minute = _0_... oz.
   (1 oz. allowed)

3. 7th minute = _0_... oz.
   (1 oz. allowed)

4. 8th minute (if required) = N/A_... oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations — NONE

---
C. Test Phase = 180° to 270°

Determination of Stoddard Solvent Collection Time Period:

1. Rollover Fixture 90°
   Rotation Time = __1__ minutes, __29__ seconds

   (Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold
   Time = 5 minutes, 0 seconds

3. TOTAL = __6__ minutes, __29__ seconds

4. NEXT WHOLE MINUTE
   INTERVAL = __7__ minutes

Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = __0__ oz.
   (5 oz. allowed)

2. 6th minute = __0__ oz.
   (1 oz. allowed)

3. 7th minute = __0__ oz.
   (1 oz. allowed)

4. 8th minute (if required) = N/A oz. (1 oz. allowed)

Provide Details of Stoddard Solvent Spillage Locations — NONE
D. Test Phase = 270° to 360°

Determination of Stoddard Solvent Collection Time Period:

1. Rollover Fixture 90°
   Rotation Time = __1__ minutes, __40__ seconds

   (Specified Range is 1 to 3 minutes)

2. FMVSS 301 Position Hold
   Time = 5 minutes, 0 seconds

3. TOTAL = __6__ minutes, __40__ seconds

4. NEXT WHOLE MINUTE INTERVAL = __7__ minutes

   Actual Test Vehicle Stoddard Solvent Spillage:

   1. First 5 minutes from onset of rotation = __0__ oz.
      (5 oz. allowed)

   2. 6th minute = __0__ oz.
      (1 oz. allowed)

   3. 7th minute = __0__ oz.
      (1 oz. allowed)

   4. 8th minute (if required) = N/A oz. (1 oz. allowed)

   Provide Details of Stoddard Solvent Spillage Locations — _NONE_
DATA SHEET 6
CAMERA LOCATION

VEHICLE NHTSA NO.: C30508 TEST DATE: 05/28/03

PHOTO PIT

TEST VEHICLE

NO STEEL GRATING ALLOWED OVER PHOTO PIT

CONCRETE PAD

TOW ROAD

MONORAIL

TOP VIEW

CAMERA 1 – REAR SIDE VIEW OF VEHICLE DURING CRASH
CAMERA 2 – FRONT SIDE VIEW OF VEHICLE DURING CRASH
CAMERA 3 – OVERHEAD VIEW OF ENTIRE IMPACT
CAMERA 4 – UNDERBODY VIEW OF FUEL TANK LOCATED IN PIT
TABLE 1 - INSTRUMENTATION & EQUIPMENT LIST

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SECTION 5

PHOTOGRAPHS
2003 HYUNDAI SANTA FE
NHTSA NO. C30508
FMVSS NO. 301L

FIGURE 5.13
UNDERBODY VIEW OF FUEL LINES AT FRONT PRE-TEST
2003 HYUNDAI SANTA FE
NHSTA NO. C30508
FMVSS NO. 301L

FIGURE 5.17
VEHICLE CERTIFICATION LABEL.
5  TIRE INFLATION PRESSURE

VEHICLE CAPACITY: WEIGHT, 400kg (880LBS)

SEATING CAPACITY: TOTAL 5 FRONT 2 REAR 3

Capacité de transport: total 5, 2 avant, 3 arrière

TIRE PRESSURSS - COLD, KPA/PSI:

Pression de gonflage à froid kPa/psi/ps2

TIRE SIZE:

UP TO 2 PERSONS

UP TO MAX. LOAD

UP TO 2 PERSONS

UP TO MAX. LOAD

2003 HYUNDAI SANTA FE
NHTSA NO. C30508
FMVSS NO. 301L

FIGURE 5.18
VEHICLE TIRE INFORMATION LABEL
2003 HYUNDAI SANTA FE
NHTSA NO. C30508
FMVSS NO. 301L

FIGURE 5.21
LEFT SIDE VIEW OF VEHICLE POST TEST
SECTION 6

BARRIER INFORMATION
NOTES:
1. Face Plate 0.50 in. (19mm) thick cold rolled steel
2. All inner reinforcements 4.0 x 2.0 x 0.19 in. (102 x 51 x 5mm) Steel Tubing
3. Impact Surface above shown without .75 x 48 x 96 in. Plywood Face attached

DIMENSIONS SHOWN IN TABLE ON NEXT PAGE
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TEST SET-UP OF COMMON CARRIAGE WITH 60" x 78" FLAT FACE IMPACT SURFACE INSTALLED:

| LEFT FRONT WEIGHT | 1081 |
| RIGHT FRONT WEIGHT | 1079 |
| LEFT REAR WEIGHT  | 882  |
| RIGHT REAR WEIGHT | 873  |

TOTAL WEIGHT 3915

* EXCLUDING 3/4" PLYWOOD FACE

DIMENSIONS FOR CTL 60" x 78" FLAT FACE IMPACT SURFACE