REPORT NUMBER 301L-GTL-03-002

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

FUJI HEAVY INDUSTRIES LTD.
2003 SUBARU BAJA MPV
NHTSA NO. C35501

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

JUNE 04, 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 (NV8-220)
WASHINGTON, D.C. 20590
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Prepared By: Delcie Muesch
Approved By: [Signature]
Approval Date: 06/04/03

FINAL REPORT ACCEPTANCE BY OVSC:
Accepted By: [Signature]
Acceptance Date: 6/18/03
Compliance tests were conducted on the subject, 2003 Subaru Baja 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 Subaru Baja 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 Subaru Baja MPV. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 4S4BT61C236102571

B. NHTSA No.: C35501

C. Manufacturer: FUJI HEAVY INDUSTRIES LTD.

D. Manufacture Date: 09/02

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 301 testing on May 15, 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 Subaru Baja 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 Subaru Baja MPV.
SUMMARY OF RESULTS

Vehicle’s NHTSA No.: C35501 Test Model: BAJA

Test Date: 05/15/03 Time: 15:56 Temperature 77 °F

Vehicle Model Year, Make, Model and Body Style:
2003 SUBARU BAJA PICKUP

Vehicle Test Weight: 4007 lbs.; Impact Velocity: 19.8 mph

Type of Front Occupant Restraint System Installed in Test Vehicle:

Driver’s DSP: TYPE 2 BELT WITH FRONTAL AIR BAG IN STEERING WHEEL

Right Passenger’s DSP: TYPE 2 BELT WITH FRONTAL AIR BAG IN DASH

Stoddard solvent spillage from Vehicle’s Fuel System: None

REMARKS:

RECORDED BY: [Signature] DATE: 05/15/03
APPROVED BY: [Signature]
DATA SHEET 1
TEST VEHICLE SPECIFICATIONS

TEST VEHICLE INFORMATION:

NHTSA No.: C35501
Year/Make/Model/Body Style: 2003 SUBARU BAJA PICKUP
Engine Data: 2.5 LITERS FLAT FOUR
Transmission Data: 5 SPEED MANUAL
Final Drive Data: AWD
Major Options: CRUISE CONTROL, POWER MOONROOF, CD PLAYER
Date Received: 03/20/03; Odometer Reading: 12 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: FUJI HEAVY INDUSTRIES LTD.
Date of Manufacture: 09/02
VIN: 4S4BT61C236102571

GVWR: 2066 kg (4555 lbs.); GAWR Front: 1002 kg (2210 lbs.) GAWR Rear: 1064 kg (2345 lbs.)

DATA FROM VEHICLE'S TIRE PLACARD:

Location of Placard on Vehicle: DRIVER'S "B" PILLAR
Tire Pressure With Maximum Capacity Vehicle Load —
Front: 30 psi; Rear: 33 psi
Recommended Tire Size: P225/60R16
Recommended Load Range: 
Recommended Cold Tire Pressure: Front = 210 kPa (30 psi) Rear = 230 kPa (33 psi)
Size of Tires on Test Vehicle: P225/60R16
Type of Spare Tire: TEMPORARY

Vehicle Capacity Data —

Type of Front Seat(s): BUCKET
Number of Occupants: Front = 2; Mid = 0; Rear = 2; Total = 4

A. VEHICLE CAPACITY WEIGHT (VCW) = 800 lbs.
B. Number of Occupants x 150 lbs. = 600 lbs.
RATED CARGO AND LUGGAGE WEIGHT (RCLW) = A - B = 200 lbs.

RECORDED BY: [Signature]
APPROVED BY: [Signature]
DATE: 05/14/03
WEIGHT OF TEST VEHICLE:

A. As Received At Laboratory (Maximum Fluids) —

Right Front = 413.67 kg (912 lbs.)  Right Rear = 379.20 kg (836 lbs.)
Left Front = 431.82 kg (952 lbs.)  Left Rear = 361.51 kg (797 lbs.)

TOTAL FRONT = 845.49 kg (1864 lbs.)  TOTAL REAR = 740.71 kg (1633 lbs.)

% of TOTAL = 53 %  % of TOTAL = 47 %

TOTAL DELIVERED WEIGHT = 1586.21 kg (3497 lbs.)

B. Calculation of Target Test Weight —

1. Total Delivered Weight = 1586.21 kg (3497 lbs.)

2. Rated Cargo & Lugg. Weight (RCLW) = 90.71 kg (200 lbs.)

3. Weight of 2 Dummies (164 lbs. each) = 149 kg (328 lbs.)

TARGET TEST WEIGHT = 1 + 2 + 3 = 1825.70 kg (4025 lbs.)

C. Vehicle, Dummies and 136.07 kg (300 lbs.) of Cargo Weight —

Right Front = 443.15 kg (977 lbs.)  Right Rear = 469.01 kg (1034 lbs.)
Left Front = 467.22 kg (1008 lbs.)  Left Rear = 448.14 kg (988 lbs.)

TOTAL FRONT = 900.38 kg (1985 lbs.)  TOTAL REAR = 917.16 kg (2022 lbs.)

% of TOTAL = 50 %  % of TOTAL = 50 %

TOTAL TEST WEIGHT = 1817.54 kg (4007 lbs.)

Weight of Ballast secured in cargo area = 136.07 kg (300 lbs.)
Type of Ballast: SAND BAGS
Method of Securing Ballast: VEHICLE CARGO TIE DOWN HOOKS
Vehicle Components Removed for Weight Reduction: NONE
DATA SHEET 2
PRE-TEST DATA CONTINUED

TEST VEHICLE ATTITUDE:

As Delivered —
Right Front: 755 mm (29.7 inches)
Left Front: 760 mm (29.9 inches)
Right Rear: 752 mm (29.6 inches)
Left Rear: 755 mm (29.7 inches)

As Tested —
Right Front: 734 mm (28.8 inches)
Left Front: 742 mm (29.2 inches)
Right Rear: 718 mm (28.2 inches)
Left Rear: 724 mm (28.5 inches)

Vehicle’s Wheelbase = ______ 2650 ______ mm (104 inches)

FUEL SYSTEM DATA:

Fuel System Capacity Listed in Owner’s Manual = ______ 64 ______ liters (16.9 gallons)
Usable Capacity Figure Furnished By COTR = ______ 64 ______ liters (16.9 gallons)

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

58.21 liters (15.38 gallons) TO 60.15 liters (15.89 gallons)

ACTUAL TEST VOLUME = ______ 59.05 ______ liters (15.6 gallons) (with entire fuel system filled)

Test Fluid Type: Stoddard solvent
Test Fluid Specific Gravity: .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 — PUMP RUNS FOR 3 SECONDS AND THEN TURNS OFF UNLESS ENGINE IS RUNNING.

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

REMARKS:

RECORDED BY: ___________________________ DATE: 05/14/03
APPROVED BY: ___________________________
DATA SHEET 3
POST IMPACT DATA

TYPE OF TEST: 301L
TEST DATE: 05/15/03; TIME: 15:56; TEMP.: 77 °F
VEH. NHTSA NO.: C35501; VIN: 4S4BT61C236102571

REQUIRED IMPACT VELOCITY RANGE: 18.9 to 19.9 mph

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

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

REMARKS:

RECORDED BY: [Signature]
DATE: 05/15/02

APPROVED BY: [Signature]
DATA SHEET 4
SUMMARY OF FMVSS 301 DATA

TEST VEHICLE NHTSA NO.: C35501 ; TEST DATE: 05/15/03

VEHICLE YEAR/MAKE/MODEL/BODY STYLE:
2003 SUBARU BAJA MPV

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: 
APPROVED BY: 
DATE: 05/15/03
**DATA SHEET 5**
**STATIC ROLLOVER TEST DATA:**

A. Test Phase = 0° to 90°

**Determination of Stoddard Solvent**

Collection Time Period:

1. Rollover Fixture 90° Rotation Time = 1 minutes, 36 seconds

(Specified Range is 1 to 3 minutes)

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

3. TOTAL = 6 minutes, 36 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
B. Test Phase = 90° to 180°

Determination of Stoddard
Solvent Collection Time Period:

1. Rollover Fixture 90°
   Rotation Time = _1_ minutes,
   .37 seconds

   (Specified Range is 1 to 3
   minutes)

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

3. TOTAL = _6_ minutes, _37_ 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___
DATA SHEET 5 CONTINUED

D. Test Phase = 270° to 360°

Determination of Stoddard Solvent Collection Time Period:

1. Rollover Fixture 90°
   Rotation Time = 1__ minutes, .41 seconds

   (Specified Range is 1 to 3 minutes)

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

3. TOTAL = 6 minutes, 41 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.: C35501 TEST DATE: 05/15/03

PHOTO PIT

TEST VEHICLE

NO STEEL GRATING ALLOWED OVER PHOTO PIT

CONCRETE PAD

TOW ROAD

MONORAIL

TOP VIEW

CAMERA 1 - FRONT SIDE VIEW OF VEHICLE DURING CRASH
CAMERA 2 - REAR 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 SUBARU BAJA
NHTSA NO. C35502
FMVSS NO. 301L

FIGURE 5.5
3/4 FRONTAL VIEW FROM LEFT SIDE
OF VEHICLE PRE-TEST
2003 SUBARU BAJA
NHTSA NO. C35502
FMVSS NO. 301L

FIGURE 5.14
VEHICLE TIRE INFORMATION LABEL
WARNING
Fuel spray may cause injury
REMOVE SLOWLY

A loose cap may
turn on check
engine light

SUBARU

FIGURE 5.15
VEHICLE FUEL CAP PRE-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    862
RIGHT REAR WEIGHT   873
TOTAL WEIGHT        3915

* EXCLUDING 3/4" PLYWOOD FACE

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