REPORT NUMBER TR-P29009-02-NC

SAFETY COMPLIANCE TESTING FOR FMVSS 124
ACCELERATOR CONTROL SYSTEMS

CHRYSLER LLC

2009 DODGE JOURNEY

5-DOOR MPV

NHTSA NUMBER: C90302

PREPARED BY:

KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CALIFORNIA 92301

AUGUST 3, 2009

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

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15. Supplementary Notes

16. Abstract

Compliance tests were conducted on the subject 2009 Dodge Journey 5-Door MPV on August 3, 2009 in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-124-06 for the determination of FMVSS 124 compliance.

Test failures identified were as follows: None

Testing was not completed. The induced wire faults caused the vehicle to be stuck in a limp home mode state with vehicle error codes. Due to time restraints, dealer intervention to reset the system and continue testing was not undertaken.

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PURPOSE OF COMPLIANCE TEST

1.1 PURPOSE OF COMPLIANCE TEST

Tests were conducted on a 2009 Dodge Journey 5-Door MPV manufactured by Chrysler LLC, to determine if the tested vehicle meets the minimum performance requirements of Federal Motor Vehicle Safety Standard (FMVSS) 124, “Accelerator Control Systems”. FMVSS 124 establishes requirements for the return of a vehicle’s throttle to the idle position when the actuating force is removed from the accelerator control or in the event of a severance or disconnection in the accelerator control system.

All tests were conducted in compliance with current National Highway Traffic Safety Administration (NHTSA), Office of Vehicle Safety Compliance (OVSC) Laboratory Procedures, specifically, TP-124-06, dated April 2000. Detailed procedures for receiving, inspecting, testing and reporting of test results are described in the test procedures and are not repeated in this report.

SECTION 2

TEST PROCEDURE

2.1 COMPLIANCE TEST PROCEDURE

A 2009 Dodge Journey 5-Door MPV was subjected to FMVSS 124 compliance testing. The tests were conducted at KARCO Engineering, LLC. in Adelanto, California on August 3, 2009. The following tests were performed:

- Inspection
- Time to Return to Idle Position (Complete Normal Operation)
- Time to Return to Idle Position (APS Disconnect)
- Time to Return to Idle Position (TPS Disconnect)
- Time to Return to Idle Position (Individual TPS Wires Open)

The vehicle is equipped with an electronic throttle control system with an accelerator pedal position sensor (APS), a throttle position sensor (TPS), an electronic control module (ECM), and a throttle plate actuator motor.

Throttle return time requirements of FMVSS 124 are as follows:

Test Vehicle GVWR	Maximum Throttle Return Time
≤4536 kg	1 second
>4536 kg	2 seconds

2.2 TEST SETUP

Each series of tests were conducted in the following manner: Throttle plate position was measured using the test vehicle's throttle position sensor (TPS) and a TDAS data acquisition system. The time base of the TDAS was used to determine throttle return time where possible. Engine coolant temperature was monitored by placing a thermocouple in the engine coolant, coupled to a digital temperature readout. Engine RPM was monitored using the vehicle's tachometer. Accelerator demand was measured at the accelerator pedal sensor (APS) using a digital voltmeter. Voltage readings were recorded for zero demand, as well as 100% demand (WOT), and then points were calculated for 25%, 50% and 75% demand. Time zero for each test was the instant that accelerator pedal demand was removed, which in the case of an induced electrical fault (APS or TPS individual wire open or grounding, APS or TPS disconnect) was simultaneous to the induced fault condition.

SECTION 3

SUMMARY OF COMPLIANCE TEST

3.1 TEST DATA SUMMARY

Testing was performed on the subject 2009 Dodge Journey 5-Door MPV on August 3, 2009 to determine compliance with FMVSS 124 “Accelerator Control Systems”. The subject vehicle was equipped with a “Drive-By-Wire” accelerator control system. Tests were conducted in the normal operating condition as well as in the following induced system failure modes:, electrical system disconnects (APS and TPS electrical connectors), electrical system open circuits (TPS wires). Testing was not completed on the 2009 Dodge Journey because the vehicle was stuck in a limp home mode state caused by TPS wire disconnects. Due to time restraints, dealer intervention to reset the system and continue testing was not undertaken.

The return times for some normal operation and fault conditions were greater than one second. In these cases, throttle angle position decreased rapidly followed by a controlled ramp down to the original idle position. Manufacturers sometimes use this ramp down strategy to improve emission control, which may be the cause here. No engine “racing” was observed at any point during the test. Complete data on the testing performed is available in Data Sheet No. 3 of this report.

SECTION 4

COMPLIANCE TEST DATA

Test Vehicle: 2009 Dodge Journey 5-Door MPV NHTSA No.: C90302

Test Program: FMVSS 124 Accelerator Control Systems Test Date: 8/3/09

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in^2	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	^oF	^oC	=(tf -32)/1.8
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2009 Dodge Journey 5-Door MPV NHTSA No.: C90302

Test Program: FMVSS 124 Accelerator Control Systems Test Date: 8/3/09

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	C90302	Anti-Lock Brakes	Yes
Make	Dodge	All Wheel Drive	No
Model	Journey	Power Steering	Yes
Body Style	5-Door MPV	Driver Front Airbag	Yes
Vin No.	3D4GG47B19T223594	Driver Side Torso Airbag	No
Color	Silver	Driver Side Head Airbag	No
Delivery Date	5/28/2009	Driver Curtain/Airbag	Yes
Odometer (Miles)	229.0	Rear Pass. Airbag	No
Dealer	Unknown	Rear Pass. Side Airbag	No
Transmission	Automatic	Rear Pass. Head Airbag	No
Final Drive	Front	Rear Pass. Curtain/Airbag	Yes
Type/No. Cyl.	4 Cylinder	Pre-Tensioners	Yes
Engine Disp. (L)	2.4	Load Limiters	Yes
Engine Placement	Transverse	Bucket Seats	Yes
Roof Rack	Yes	Air Cond.	Yes
Sunroof/T-Top	No	AM/FM CD	Yes
Tinted Glass	Yes	Tilt Steering	Yes
Traction Control	Yes	Automatic Door Locks	Yes
Power Brakes	Yes	Power Windows	Yes
Front Disc	Yes	Power Seats	No
Rear Disc	Yes	Other	N/A

Does Owners Manual provide instructions to turn off automatic door locks.	No

DATA FROM CERTIFICATION LABEL

Manufactured By	Chrysler LLC	GVWR (kg)	2271
		GAWR Front (kg)	1248
Date of Manufacture	Jun-08	GAWR Rear (kg)	1316

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number of Occupants	2	3		5
Capacity Weight (VCW) (kg)				412.0

DATA SHEET NO. 2

VEHICLE THROTTLE CONTROL DATA

Test Vehicle: 2009 Dodge Journey 5-Door MPV NHTSA No.: C90302

Test Program: FMVSS 124 Accelerator Control Systems Test Date: 8/3/09

THROTTLE CONTROL SYSTEM INFORMATION

Throttle Control System Description	Drive by Wire
Describe sources of energy to return throttle to idle position	2 Springs on APS
Accelerator Throttle Position Sensor	Yes
Electronic Control Module	Yes
Throttle Plate Actuator Motor	Yes
Throttle Plate Position Sensor	Yes

WIRE DESCRIPTION

APS Wire Number	Color	TPS Wire Number	Color
1	White/Brown	1	Blue/Purple
2	Brown/Purple	2	Brown/Blue
3	Yellow/Pink	3	Brown/Orange
4	Brown/White	4	Blue/Green
5	Brown/Yellow	5	Brown
6	Brown/Pink	6	Brown/Green

DATA SHEET NO. 3
SUMMARY OF TEST REQUIREMENTS AND RESULTS

Test Vehicle: 2009 Dodge Journey 5-Door MPV NHTSA No.: C90302

Test Program: FMVSS 124 Accelerator Control Systems Test Date: 08/03/09

Test Description / Connector	Engine Temp. (F)	Idle RPM / Throttle Position %	Return Time (msec)	Pass/Fail
(Normal Operation) 25%	180	750 / 1%	#N/A	See note 1, 2 & 3
(Normal Operation) 50%	180	750 / 1%	#N/A	See note 1, 2 & 3
(Normal Operation) 75%	180	750 / 1%	#N/A	See note 1, 2 & 3
(Normal Operation) 100%	180	750 / 1%	#N/A	See note 1, 2 & 3
(APS Disconnect)	180	750 / 1%	1780.0	See note 1 & 2
(TPS/ Throttle Plate Motor Disconnect)	180	750 / 1%	#N/A	See note 4
(TPS Wire 1 Open)	180	750 / 1%	#N/A	See note 5
(TPS Wire 2 Open)	180	750 / 1%	170.0	Pass/ See note 1
(TPS Wire 3 Open)	180	750 / 1%	#N/A	See note 4,5
All other test configurations	*	*	*	See note 6

(1) Throttle plate would only open to approximately 11% irrespective of the accelerator pedal position

(2) The return times for some normal operation and fault conditions resulted in return time greater than 1 second. In these cases, throttle angle position decreased rapidly followed by a controlled ramp down to the original idle position. Manufacturers sometimes use this ramp- down strategy for improved emission control which may be the case here. No engine “racing” was observed at any point in the testing.

(3) Throttle returned to baseline position at approximately 6 seconds

(4) Induced wire fault caused loss of throttle sensor reading

(5) Throttle never returned to baseline position

(6) The induced wire faults caused the vehicle to be stuck in a limp home mode state with vehicle error codes. No other testing was performed due to this condition.

APPENDIX A

PHOTOGRAPHS

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 124

Figure A-1: Front View of Vehicle

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 124

Figure A-2: Left Side View of Vehicle

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 124

Figure A-3: Right Side View of Vehicle

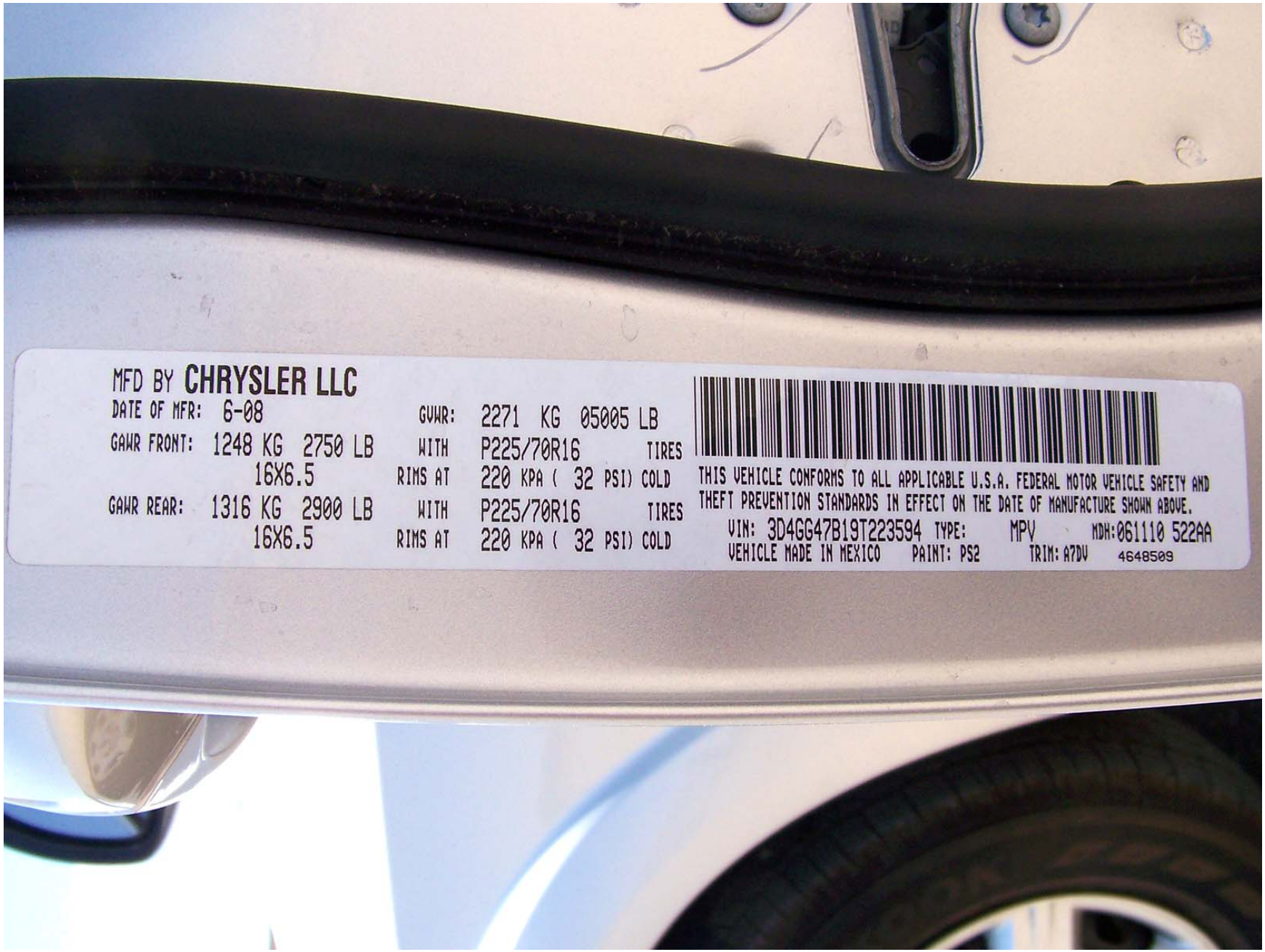
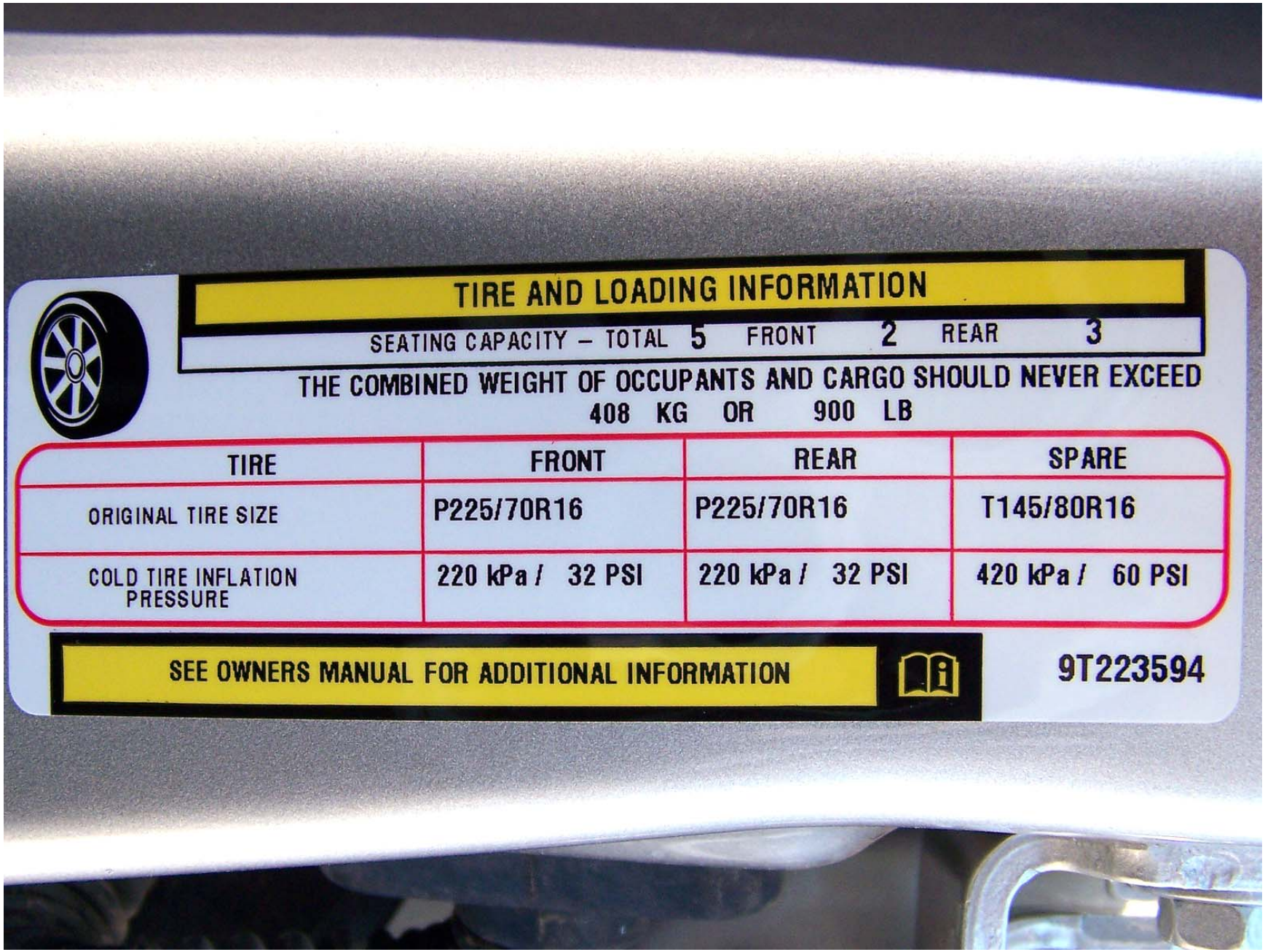
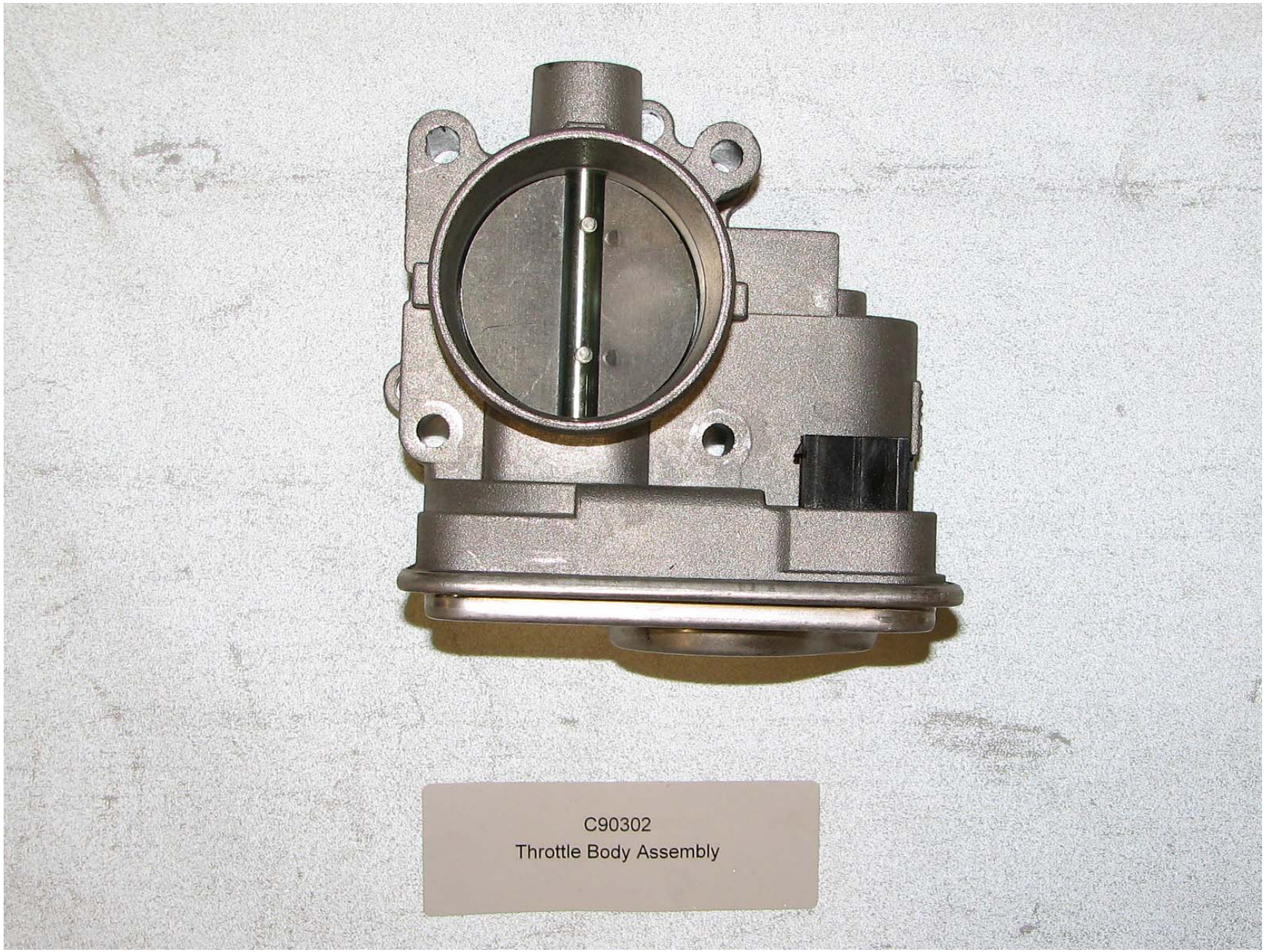


Figure A-4: Vehicle's Certification Label



2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 124

Figure A-5: Vehicle's Tire Placard



2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 124

Figure A-6: Throttle Body Assembly

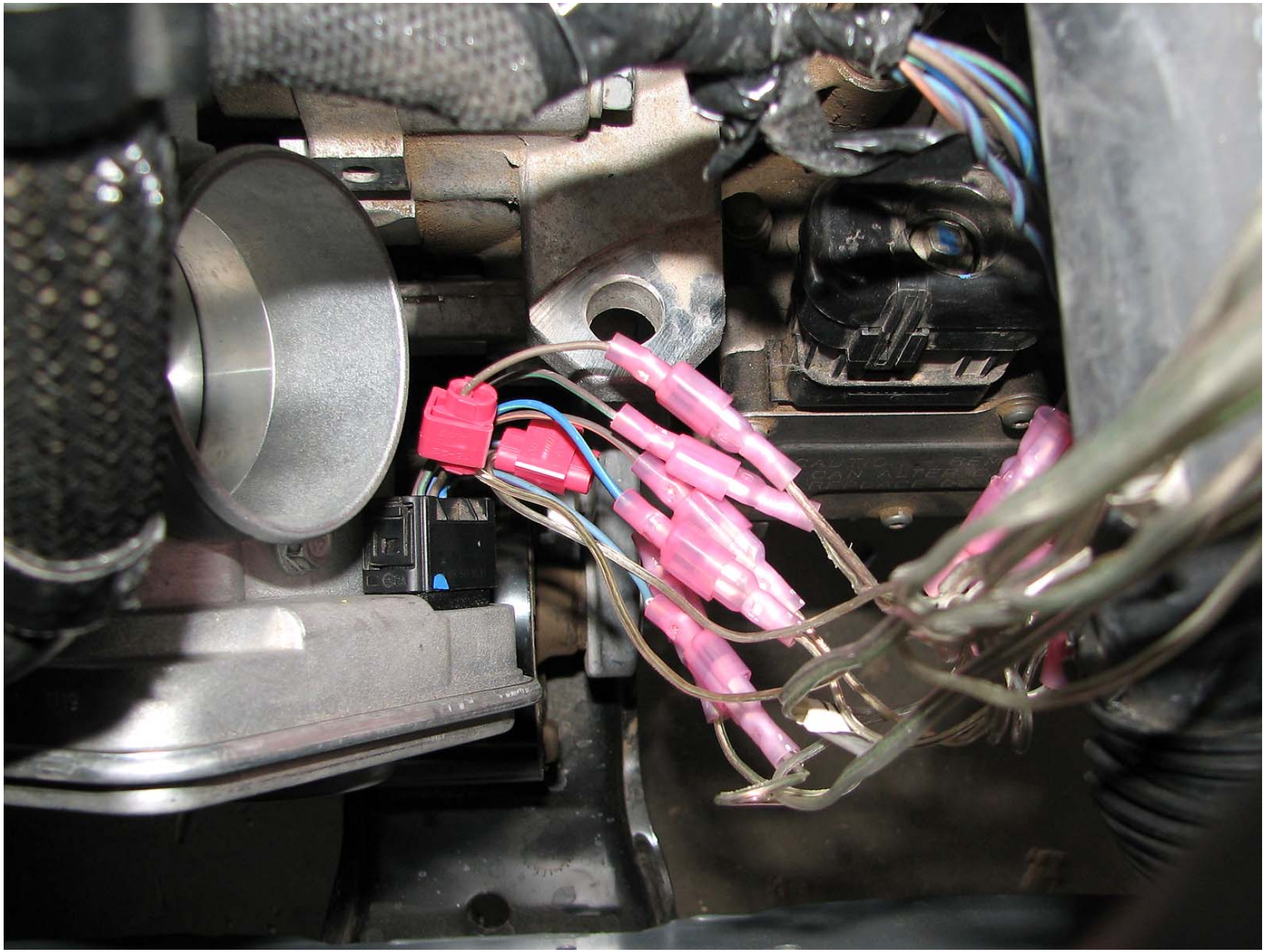


Figure A-7: Throttle Body Test Setup

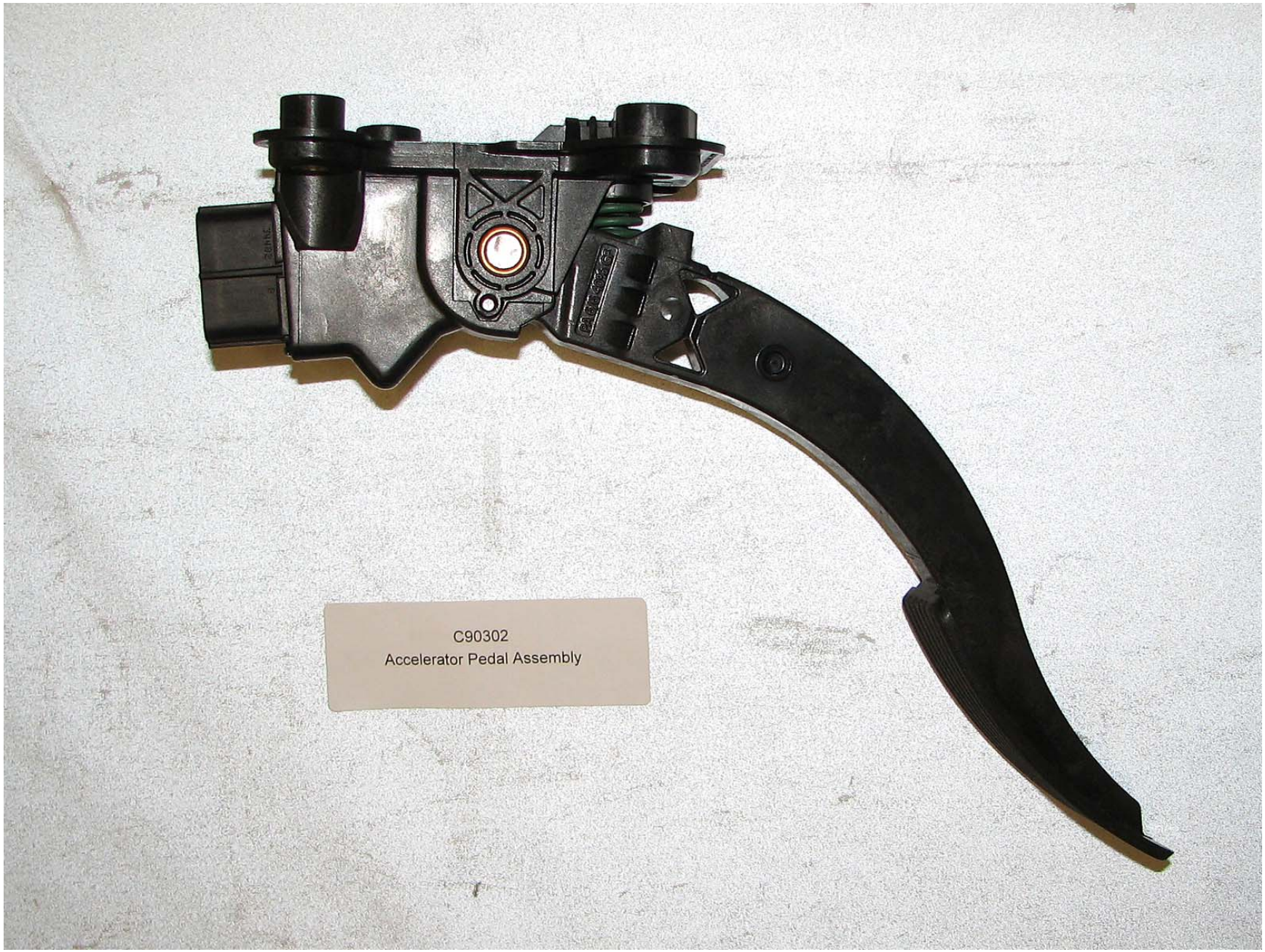


Figure A-8: Accelerator Pedal Assembly

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 124

2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 124

Figure A-9: Vehicle Test Setup

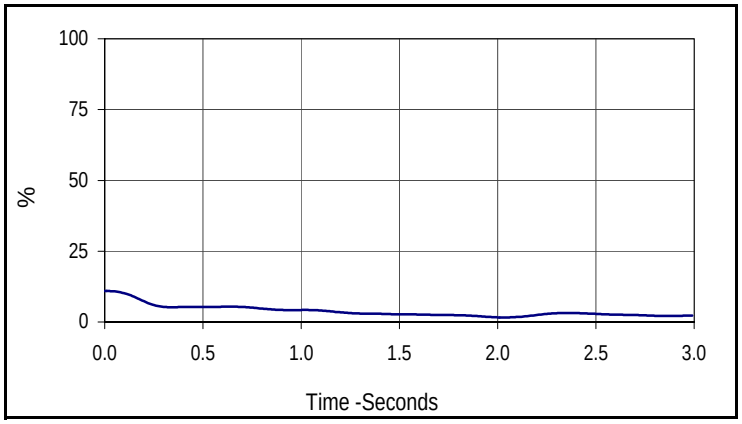
2009 DODGE JOURNEY
NHTSA NO. C90302
FMVSS NO. 124

Figure A-10: Instrumentation

APPENDIX B

DATA PLOTS

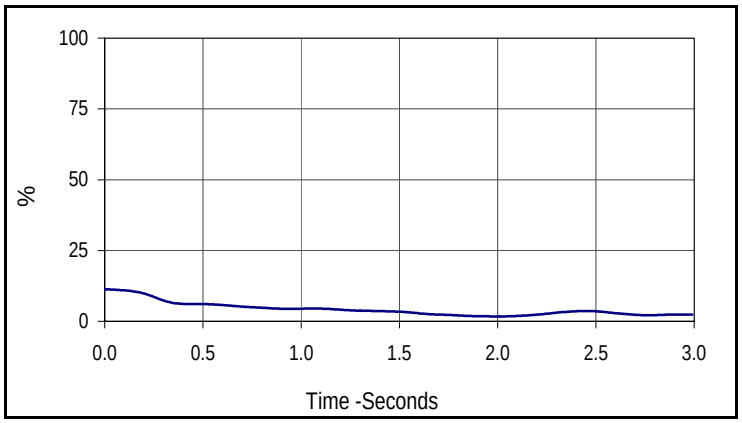
Test Vehicle:	2009 Dodge Journey 5-Door MPV	Test Date:	8/3/09
Test Program:	FMVSS 124 Accelerator Control Systems	NHTSA No.:	C90302



Curve Description			
Throttle Position (Normal Operation)			
CURNO	Type	Filter Freq	Units
001	FIL	2	%
Max	Time	Return Time (msec)	
10.9	0.0	*	

Throttle % reading at baseline (idle) is 1%

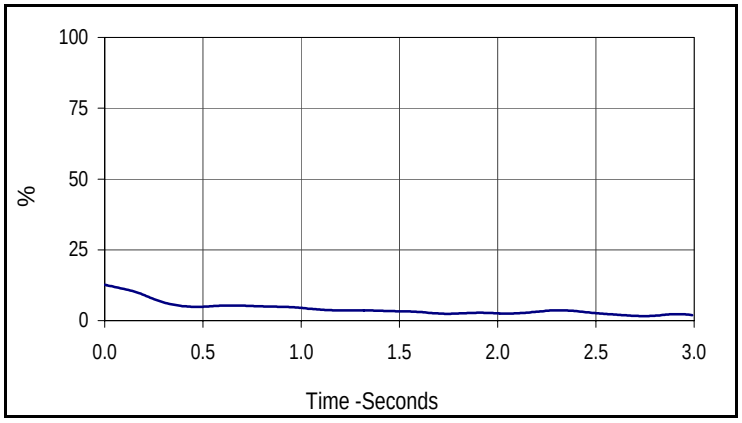
* Throttle returned to baseline position at approximately 6 seconds



Curve Description			
Throttle Position (Normal Operation)			
CURNO	Type	Filter Freq	Units
002	FIL	2	%
Max	Time	Return Time (msec)	
11.3	0.0	*	

Throttle % reading at baseline (idle) is 1%

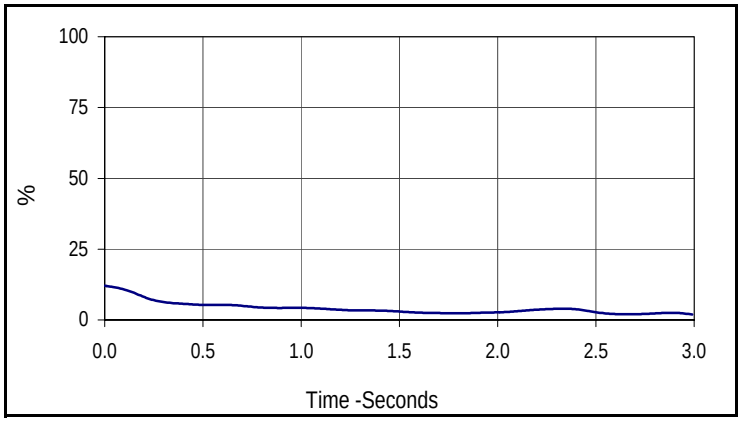
* Throttle returned to baseline position at approximately 6 seconds



Curve Description			
Throttle Position (Normal Operation)			
CURNO	Type	Filter Freq	Units
003	FIL	2	%
Max	Time	Return Time (msec)	
12.7	0.0	*	

Throttle % reading at baseline (idle) is 1%

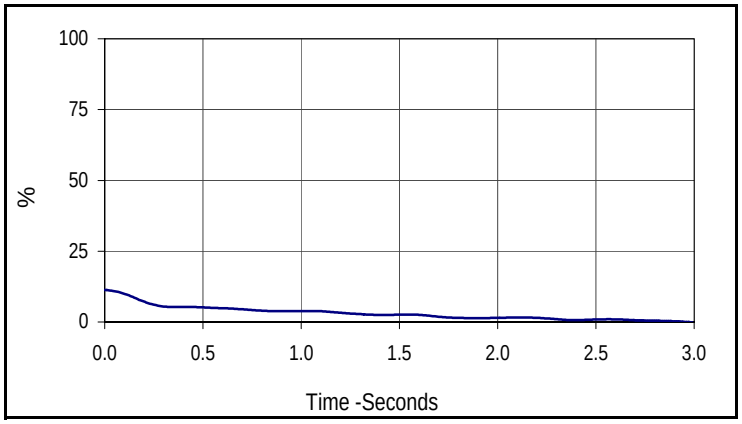
* Throttle returned to baseline position at approximately 6 seconds



Curve Description			
Throttle Position (Normal Operation)			
CURNO	Type	Filter Freq	Units
004	FIL	2	%
Max	Time	Return Time (msec)	
12.0	0.0	*	

Throttle % reading at baseline (idle) is 1%

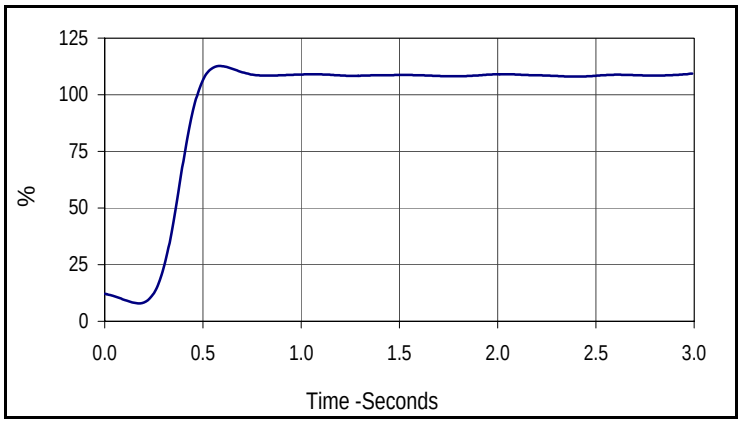
* Throttle returned to baseline position at approximately 6 seconds



Curve Description			
Throttle Position (APS Disconnect)			
CURNO	Type	Filter Freq	Units
005	FIL	2	%
Max	Time	Return Time (msec)	
11.3	0.0	1780.0	

Throttle % reading at baseline (idle) is 1%

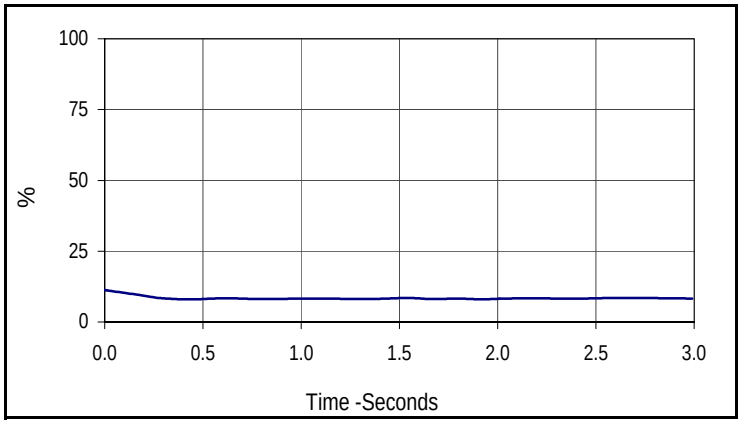
All return times were calculated at a return to 1%



Curve Description			
Throttle Position (TPS/ Throttle Plate Motor Disconnect)			
CURNO	Type	Filter Freq	Units
006	FIL	2	%
Max	Time	Return Time (msec)	
112.7	0.6	*	

Throttle % reading at baseline (idle) is 1%

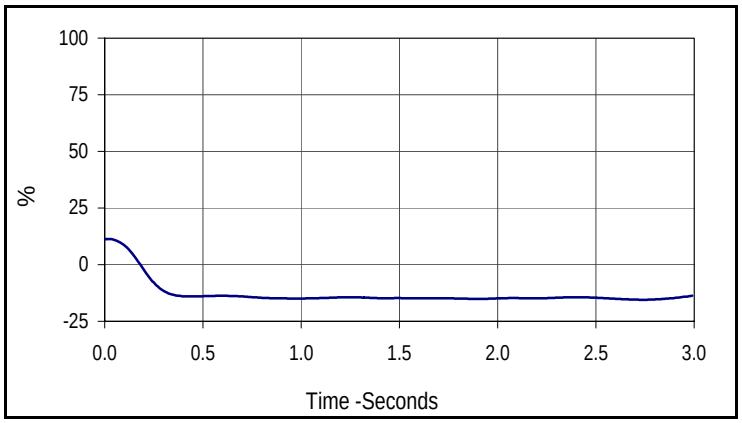
* Induced wire fault caused loss of sensor reading



Curve Description			
Throttle Position (TPS Wire 1 Open)			
CURNO	Type	Filter Freq	Units
007	FIL	2	%
Max	Time	Return Time (msec)	
11.3	0.0	*	

Throttle % reading at baseline (idle) is 1%

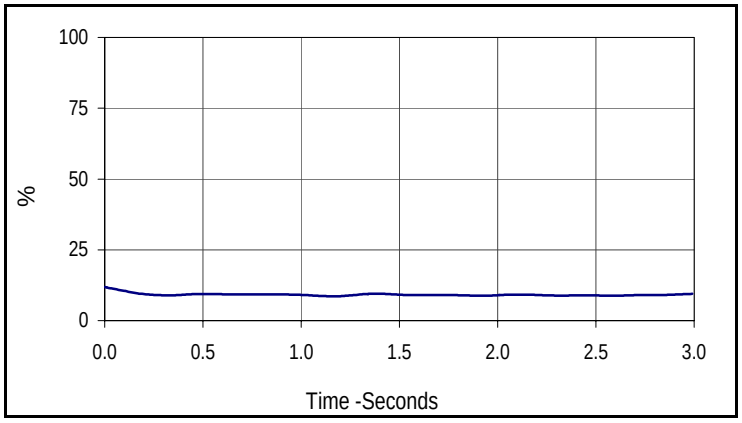
* Throttle never returned to baseline position.



Curve Description			
Throttle Position (TPS Wire 2 Open)			
CURNO	Type	Filter Freq	Units
008	FIL	2	%
Max	Time	Return Time (msec)	
11.4	0.0	170.0	

Throttle % reading at baseline (idle) is 1%

All return times were calculated at a return to 1%



Curve Description			
Throttle Position (TPS Wire 3 Open)			
CURNO	Type	Filter Freq	Units
009	FIL	2	%
Max	Time	Return Time (msec)	
11.8	0.0	*	

Throttle % reading at baseline (idle) is 1%

* Throttle never returned to baseline position.

* Induced wire fault caused loss of sensor reading

APPENDIX-C

TEST EQUIPMENT AND CALIBRATION INFORMATION

FMVSS 124 Accelerator Control Systems

Test Equipment List and Calibration Information

8/3/09

2009 Dodge Journey 5-Door MPV

Description	Manufacturer	Model No.	Serial No.	Limit	Accuracy	Cal. Date	Due Cal.
TDAS	DTS	TDAS	DM0101	N/A	SAE J211	11/14/08	11/14/09
Computer	Toshiba	PAS4014	X8065355A	N/A	N/A	N/A	N/A

APPENDIX D

MANUFACTURER SUBMITTED INFORMATION

FORM – 124
Rev. 10/10/08

VEHICLE INFORMATION / TEST SPECIFICATIONS

FMVSS No. 124

Requested Information:

1. A sketch of the driver operated accelerator control system (ACS) starting from the accelerator pedal up to and including the fuel metering device (carburetor, fuel injectors, fuel distributor, or fuel injection pump).

See page 4 for the drawing of the driver operated accelerator control system (ACS).

2. For Normal ACS operation, the method utilized to determine the engine idle state (air throttle plate position, fuel delivery rate, other).

The method used to determine the engine idle state was by the air throttle plate position.

3. For Fail-Safe operation of the ACS (disconnection or severance), the method utilized to determine return of engine power to the idle state (air throttle plate position, fuel delivery rate, air intake, engine rpm, other)

For fail-safe operation of the ACS (disconnected 1 of the 2 accelerator pedal return springs), the method used to determine return of engine power to the idle state was by the air throttle plate position.

4. Is the vehicle ACS equipped with any of the following:

A. Accelerator Pedal Position Sensor (APS)
B. Throttle Plate Position Sensor (TPS)
C. Electronic Control Module (ECM)
D. Air throttle plate actuator motor

The vehicle ACS is equipped with A, B, C, & D: Accelerator pedal position sensor (APS), Throttle plate position sensor (TPS), Electronic control module (ECM), and an Air throttle plate actuator motor.

5. If air throttle plate equipped, is there a procedure which can be utilized by the test laboratory to measure the position of the throttle plate by tapping into the TPS or ECM? If so, please describe.

The method used to determine the throttle plate position was by an I-Box. The I-box displays the TPS values which the ECM uses for engine control.

6. Point(s) chosen to demonstrate compliance with FMVSS No. 124 for single point disconnect and severance.

The point chosen to demonstrate compliance with FMVSS-124 for a single point mechanical severance was by removing the outer return spring in the accelerator pedal module, demonstrating a worst case condition.

7. Where applicable, were connections in the ACS beyond the ECM such as the fuel injectors tested for disconnection and severance. If yes, provide details.

There were no other disconnections made in the ACS.

8. Where applicable, were idle return times tested for electrical severance accompanied by shorting to ground? If yes, please provide details.

Yes, idle return times were tested for electrical severance. Please see page 5 for details.

9. All sources of return energy (springs) for the accelerator pedal and if applicable, the air throttle plate.

Sources of energy to return the vehicle to idle are (2) return springs in the accelerator pedal and the air throttle plate actuator motor.

10. If fuel delivery rate is used to demonstrate return to idle state, provide:

A. The method used to measure this signal i.e. connection to standard SAE J1587 data bus.
B. Equipment required to measure signal.

Fuel delivery rate was not used to demonstrate return to idle.

11. Fuel rate signal output range at the idle state.

Fuel delivery rate was not used to demonstrate return to idle.

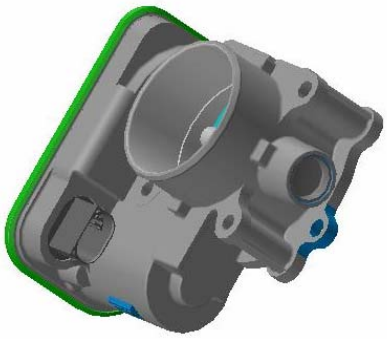
12. Is the ACS equipped with a limp home mode? If yes, provide operation description.

The ACS is equipped with a limp home mode in the event of a failure in the electronic throttle control system. In the event of a failure (with the exception of failure of only one of the two redundant throttle position feedback sensors), the powertrain controller will not send power to the DC motor. The throttle plate will return to and remain at a pre-determined angle above fully closed by a return spring(s). The limp home control system in the ECU programming is able to adjust the engine power somewhat by controlling the fuel and spark schedules. If there is a failure of only one of the two redundant throttle position feedback sensors, the ACS will perform normally since there is one good sensor still in operation. In either failure situation, the ETC warning lamp will illuminate.

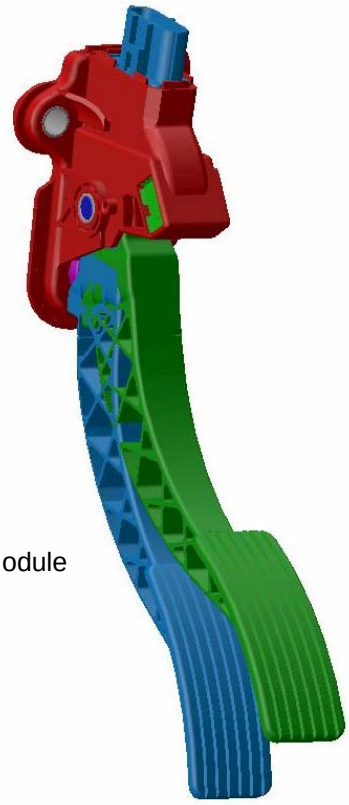
13. Method by which the test laboratory can record engine RPM by connection to ECM, OBD connector, etc.

The engine RPM may be recorded by an instrument such as a Chrysler interrogator box development tool or a Starscan diagnostic tool connected to the diagnostic connector located in the vehicle interior.

Vehicle Information / Test Specifications
FMVSS 124 Accelerator Control System
Form 124
2009 JC49D Vehicle



Throttle Body



Accelerator Pedal Module

FMVSS124 Dynamic Testing
ETC Throttle Body:
DC Motor circuits
Create open circuit in motor positive
Create open circuit in motor negative
Short ETC throttle body motor positive circuit to ground
Short ETC throttle body motor negative circuit to ground
throttle position sensor #1 signal circuit
Create open ETC throttle position sensor #1 signal circuit
Short to ground the ETC throttle position sensor #1 signal circuit
throttle position sensor #2 signal circuit
Create open ETC throttle position sensor #2 signal circuit
Short to ground the ETC throttle position sensor #2 signal circuit
throttle position sensor 5 volt power circuit
Create open ETC throttle position sensor power circuit
Short to ground the ETC throttle position sensor power circuit
throttle position sensor ground circuit
Create open ETC throttle position sensor ground circuit
ETC Pedal Assembly:
pedal value sensor #1 signal circuit
Create open ETC pedal value sensor #1 signal circuit
Short to ground the ETC pedal value sensor #1 signal circuit
pedal value sensor #1 5 volt power circuit
Create open ETC pedal value sensor power circuit
Short to ground the ETC pedal value sensor power circuit
pedal value sensor 1 ground circuit
Create open ETC pedal value sensor no. 1 ground circuit
pedal value sensor #2 signal circuit
Create open ETC pedal value sensor #2 signal circuit
Short to ground the ETC pedal value sensor #2 signal circuit
pedal value sensor #2 5 volt power circuit
Create open ETC pedal value sensor #2 power circuit
Short to ground the ETC pedal value sensor #2 power circuit
pedal value sensor #2 ground circuit (unique for each pedal sensor)
Create open ETC pedal value sensor #2 ground circuit
pedal assy spring modification
Test with primary spring removed to alter normal pedal mechanical return
Test with secondary spring removed to alter normal pedal mechanical return

Accelerator Control System – Performance
2009 JC49D Vehicle

The accelerator control system design for the 2009 JC49D vehicle is identical to the 2008 JS vehicle family for all engine combinations.

Details of compliance procedure CP-351D for MVSS 124 and CMVSR 124 are described in this report.

The accelerator control system in the 2.4L JC49D is identical to the 2008 PM49 vehicle. No new testing was required. The accelerator control system in the 2.7L JC49D is identical to the 2008 JS vehicle. No new testing was required.

Chart I lists the accelerator control system that was tested for the JC49D vehicle. The vehicles that are listed have identical accelerator control systems to the JC49D vehicles.

Chart II lists the test vehicles used to determine compliance as indicated in section 3.

Chart III shows the return to idle test results after a 12-hour soak period at +52 degrees C and -40 degrees C as indicated in section C.

Test equipment used was an interrogator box (IBox). The IBox recorded the throttle closure time from full pedal travel back to idle.

From the results of the compliance testing, it is concluded that the 2009 JC49D vehicle complies with the fail-safe performance requirements specified for MVSS 124 and CMVSR 124.

Chart I

Vehicle / Body Style / Engine / Transmission

Vehicle	Body Style	Engine	Transmission
JSC41	41	2.7L and 3.5L	Automatic
PM	49	2.4L	CVT

Chart II

Vehicle Test List

Vehicle Description	Vehicle #	Vin #	Test Date +52C	Test Date -40C
2006 PM 2.4L CVT	PM06S1115	1B3DE78K66D500121	Sept. 21, 2005	Sept. 22, 2005
2007 JS 2.7L ATX	JSC5531	1C3LC56R87A270027	July 14, 2006	July 17, 2006

Chart III

Return-to-idle Test Results

Vehicle System Description			Test Conditions	Closure Time (Seconds)	
Body	Engine	Trans	Accelerator Pedal Springs	+52 degrees C	-40 degrees C
PM	2.4L WE	CVT	Outer spring in pedal disconnected	1.0 sec	1.5 sec
JS	2.7L V6	ATX	Outer spring in pedal disconnected	1.0 sec	2.88 sec

Accelerator Control System – Design
2009 JC49D Vehicle

Details of compliance procedure CP-352B for MVSS 124 & CMVSR 124 are described in this report.

The 2009 JC49D accelerator control system design is identical to the 2008 JS vehicle family for all engine combinations.

The series of devices that allow the driver of a vehicle to control engine speed is known as the Accelerator Control System. This system consists of the foot-operated accelerator pedal assembly and the throttle body. The accelerator pedal and throttle body are electronically controlled.

Chart I lists the engineering drawings for the throttle control return system components as indicated in section C1.

Chart II lists the throttle control return spring system as indicated in section C2.

For the 2009 JC49D vehicle, the throttle body and accelerator pedal each contain (2) independent energy sources that will return the vehicle to an idle state. In the event of failure of one energy source the remaining source is capable of returning the engine to idle.

Examination of the drawings and the systems verifies the existence of throttle return springs, and reveals that the designed spring loads, when the throttle is in the curb idle position, are not less than the normal loads established by testing.

From the results of compliance evaluation, it is concluded that the 2009 JC49D vehicle has by design, at least two sources of energy capable of returning the throttle to idle from any accelerator position specified for MVSS 124 & CMVSR 124.

Chart I

Accelerator Control System Component Drawings

Vehicle	Body Style	Engine	Transmission	Throttle Body	Accelerator Pedal
JCD	49	2.4L	All	04891735AC	04891585AB
JCD	49	2.7L & 3.5L	All	04861691AA	04891585AB

Chart II

Accelerator Pedal Return Spring System

Vehicle	Body Style	Engine	Trans	Return Springs	Accelerator Pedal Return Springs	
					Inner (Newtons)	Outer (Newtons)
JCD	49	All	All	2	Idle Load = 28 N WOT Load = 61 N Rate = 4.0 N/mm	Idle Load = 67N WOT Load = 131 N Rate = 7.7 N/mm