

REPORT NUMBER 401-STF-09-001

SAFETY COMPLIANCE TESTING FOR FMVSS NO. 401 INTERIOR TRUNK RELEASE

GENERAL MOTORS CORPORATION
2009 CHEVROLET IMPALA
FOUR-DOOR PASSENGER CAR
NHTSA NO. C90100

U.S. DOT SAN ANGELO TEST FACILITY
131 COMANCHE TRAIL, BUILDING 3527
GOODFELLOW AFB, TEXAS 76908



March 26, 2009

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
NVS-220
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SECTION 1

INTRODUCTION

1.1 PURPOSE OF COMPLIANCE TEST

A 2009 Chevrolet Impala four-door passenger car was tested to determine if the vehicle was in compliance with the requirements of FMVSS 401. All tests were conducted in accordance with NHTSA/Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure TP-401-01 dated August 8, 2007.

1.2 TEST VEHICLE

The test vehicle was a 2009 Chevrolet Impala four-door passenger car. Nomenclatures applicable to the test vehicle are:

A. Vehicle Identification Number: 2G1WB57K991103176

B. NHTSA Number: C90100

C. Manufacturer: General Motors Corporation

D. Manufacture Date: 07/2008

1.3 TEST DATE

The test vehicle was tested January 8, 2009.

SECTION 2

TEST PROCEDURE AND DISCUSSION OF RESULTS

2.1 TEST PROCEDURE

Prior to test, the test vehicle was inspected for completeness and systems operability, including battery capability and trunk closure function. The vehicle was then photographically documented as required by the NHTSA/OVSC Test Procedure. The owner's manual was reviewed, and pertinent trunk release information was noted.

The rear trunk manual release system stationary vehicle tests were conducted with an occupant enclosed in the trunk compartment with the lid shut. An assistant was present and prepared to release the occupant if necessary. The compartment was evaluated with all removable equipment furnished by the manufacturer stowed in accordance with vehicle label instructions.

The procedure used consists of the following steps:

1. Determine the means by which a trapped person within the trunk would escape from the compartment, e.g. pull of a T-handled release mechanism, rotation of fixed lever release mechanism, push of a button, etc.
2. For informational purposes, install a linear force transducer to the release mechanism determined above and record the force required to be applied by the trapped occupant to escape.
3. Verify that the release mechanism is visible in the darkened trunk S4.2(a), and determine method used, e.g. phosphorescence or auxiliary lighting. Some time may be required to allow for the eyes to adjust to the darkened environment within the trunk compartment. Photograph if possible the lighted release mechanism.
4. With the vehicle stationary and no key in the ignition (representing unoccupied vehicle), actuate the release mechanism and verify that the trunk lid releases from all latching positions. Record force required during 3 attempts to release trunk latching mechanism.
5. Repeat step 4 above, except with the engine idling (time with trunk lid latched not to exceed 30 seconds).

2.2 DISCUSSION OF RESULTS

The force required to release the trunk lid did not exceed twenty-three (23) Newtons on any attempt. The data indicate compliance of the test vehicle's manual trunk release system for the No Key in Ignition and the Idling Vehicle trunk release tests.

SECTION 3
TEST DATA

DATA SHEET 1
FMVSS No. 401 – TEST DATA SUMMARY

MODEL YEAR/MAKE/MODEL/BODY STYLE: 2009 Chevrolet Impala 4-door passenger car

VEHICLE NHTSA NUMBER: C90100 VIN: 2G1WB57K991103176

GVWR: 2,066 kg (4,554 lbs) DATE OF MANUFACTURE: 07/2008

TEST LAB: U. S. DOT San Angelo Test Facility TEST DATE: January 8, 2009

	PASS/FAIL	COMMENTS
Automatic or Manual release mechanism inside the trunk compartment. S4.1	PASS	Manual
If manual release, lighting feature is included. S4.2(a)	PASS	Phosphorescence
Except as provided by S4.3(b), actuation of release mechanism required by S4.1 completely releases trunk lid from all latching positions of the trunk lid latch. S 4.3(a)	PASS	

REMARKS: None

RECORDED BY: Jack R. Stewart

DATE: January 8, 2009

APPROVED BY: Kenneth H. Yates

DATA SHEET 2
TEST PREPARATION INFORMATION

MODEL YEAR/MAKE/MODEL/BODY STYLE: 2009 Chevrolet Impala 4-door passenger car

VEHICLE NHTSA NUMBER: C90100 TEST DATE: January 8, 2009

TRUNK LOCATION: Rear

NUMBER OF TRUNK LATCHING POSITIONS: One

INTERIOR TRUNK RELEASE: Manual

EQUIPPED WITH POWER CLOSURE ASSISTING DEVICE: No

OWNER'S MANUAL DESCRIPTION OF TRUNK RELEASE: Yes

REMOVABLE EQUIPMENT DELIVERED IN TRUNK:

SPARE TIRE: Yes SIZE: T125/70D16

TIRE JACK: Yes

LUG WRENCH: Yes

REMARKS: Tire change equipment is stored beneath removable trunk floor.

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DATA SHEET 3 (Sheet 1 of 2)
MANUAL TRUNK RELEASE OPERATION

MODEL YEAR/MAKE/MODEL/BODY STYLE: 2009 Chevrolet Impala 4-door passenger car

VEHICLE NHTSA NUMBER: C90100 TEST DATE: January 8, 2009

Method used to actuate interior trunk release: Grab handle

Can test personnel enter trunk and be closed within? Yes

Size of occupant: 5' 10", large frame

Is there access to the trunk compartment by folding down rear seat or partition? No

Does release mechanism require electric power? No

Can release mechanism be easily seen inside the closed trunk? Yes

Method used by vehicle manufacturer to ensure that
release mechanism is visible in the closed trunk compartment: Phosphorescence

Laboratory test method used to determine visibility of release mechanism: Trunk entry

DATA SHEET 3 (Sheet 2 of 2)
MANUAL TRUNK RELEASE OPERATION

Vehicle Stationary (0 km/h)	Force in Newtons Required to Release Trunk Lid (no requirement)	Trunk Released from All Latching Positions	Pass/Fail
NO KEY IN IGNITION			
Attempt 1	21.6	Yes	Pass
Attempt 2	22.4	Yes	Pass
Attempt 3	21.8	Yes	Pass
Average	21.9		
ENGINE IDLING			
Attempt 1	22.6	Yes	Pass
Attempt 2	21.6	Yes	Pass
Attempt 3	22.4	Yes	Pass
Average	22.2		

TEST RESULTS

PASS

REMARKS: This vehicle has no key entry for the trunk. In the case of a power failure, the
the trunk will not open using the external trunk releases. Loss of power does not affect the
manual trunk release in the trunk compartment. The 2009 Chevrolet Impala has a rear
flip-and-fold-flat option to allow trunk access from the rear seat. This test vehicle did not have
option.

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DATE: January 8, 2009

APPROVED BY: Kenneth H. Yates

SECTION 4
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO	CAL. DATE	NEXT CAL. DATE
DIGITAL FORCE GAGE	WAGNER INSTRUMENTS FORCE TEN	SERIAL #10363	8/6/2008	8/6/2009

SECTION 5
PHOTOGRAPHS



2009 CHEVROLET IMPALA
NHTSA NO. C90100
FMVSS NO.401

FIGURE 5.1
FRONT OF VEHICLE



2009 CHEVROLET IMPALA
NHTSA NO. C90100
FMVSS NO.401

FIGURE 5.2
LEFT SIDE VIEW OF VEHICLE



2009 CHEVROLET IMPALA
NHTSA NO. C90100
FMVSS NO. 401

FIGURE 5.3
RIGHT SIDE VIEW OF VEHICLE



2009 CHEVROLET IMPALA
NHTSA NO. C90100
FMVSS NO. 401

FIGURE 5.4
LEFT REAR QUARTER VIEW



2009 CHEVROLET IMPALA
NHTSA NO. C90100
FMVSS NO. 401

FIGURE 5.5
RIGHT REAR QUARTER VIEW



MFD BY GENERAL MOTORS OF CANADA LTD.

DATE	GVWR	GAWR FRT	GAWR RR
07/08	2066 KG 4554 LB	1118 KG 2464 LB	948 KG 2090 LB

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY, BUMPER, AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

2G1WB57K991103176

TYPE: PASS CAR

2009 CHEVROLET IMPALA
NHTSA NO. C90100
FMVSS NO. 401

FIGURE 5.6
VEHICLE CERTIFICATION LABEL



2009 CHEVROLET IMPALA
NHTSA NO. C90100
FMVSS NO. 401

FIGURE 5.7
VEHICLE TRUNK COMPARTMENT INTERIOR
SHOWING ORIGINAL EQUIPMENT INSTALLED



2009 CHEVROLET IMPALA
NHTSA NO. C90100
FMVSS NO. 401

FIGURE 5.8
VEHICLE TRUNK COMPARTMENT MANUAL
RELEASE MECHANISM



2009 CHEVROLET IMPALA
NHTSA NO. C90100
FMVSS NO. 401

FIGURE 5.9
RELEASE MECHANISM WITH TEST
EQUIPMENT ATTACHED



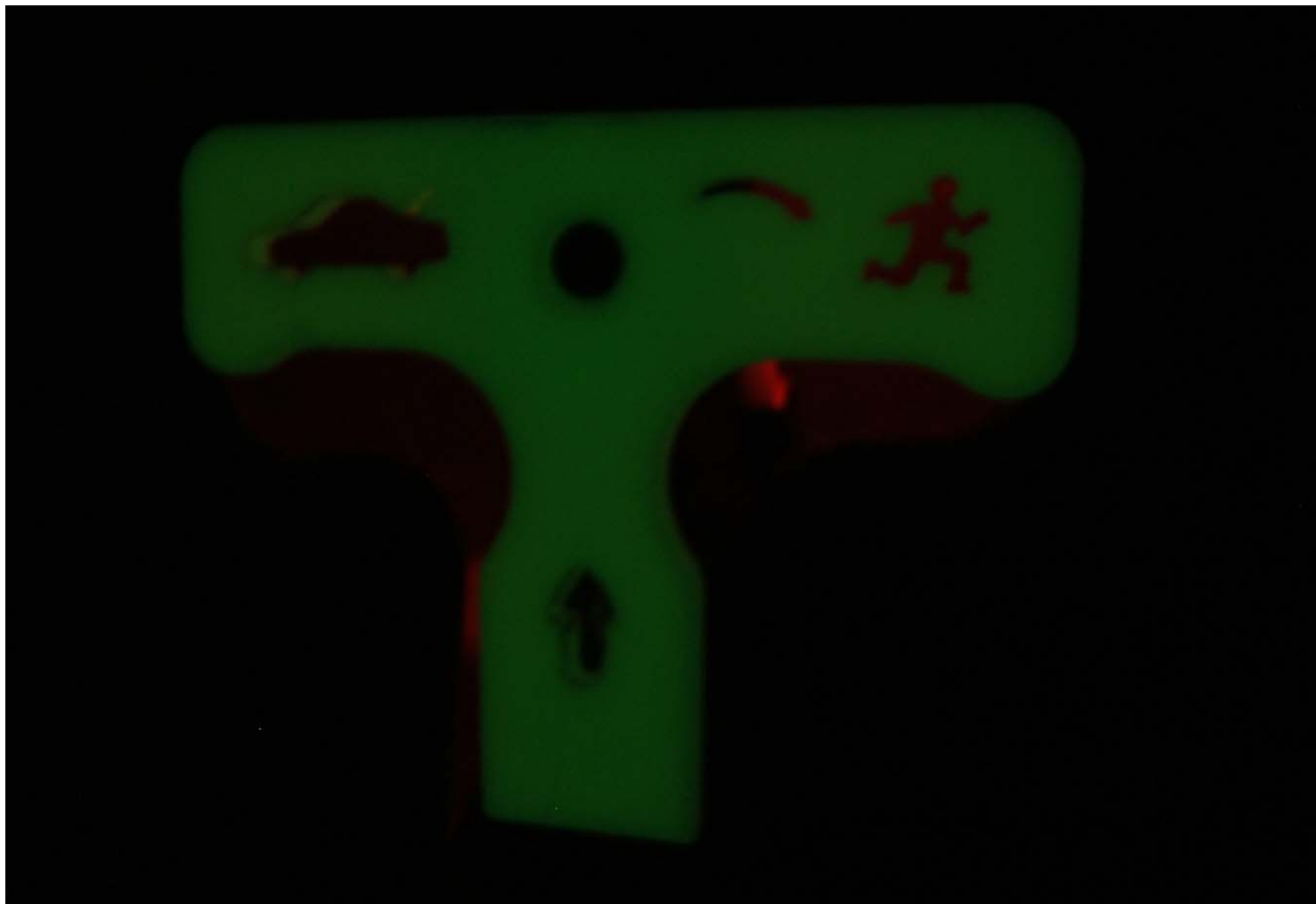
2009 CHEVROLET IMPALA
NHTSA NO. C90100
FMVSS 401

FIGURE 5.10
TEST OBSERVER IN
TRUNK COMPARTMENT



2009 CHEVROLET IMPALA
NHTSA NO. C90100
FMVSS NO. 401

FIGURE 5.11
TRUNK LID EXTERIOR



2009 CHEVROLET IMPALA
NHTSA NO. C90100
FMVSS NO. 401

FIGURE 5.12
RELEASE MECHANISM INSIDE CLOSED TRUNK


SECTION 6
OWNER'S MANUAL PAGE

Trunk Release

To open the trunk from the outside, press the open trunk button on the remote keyless entry transmitter, if equipped.

Remote Trunk Release

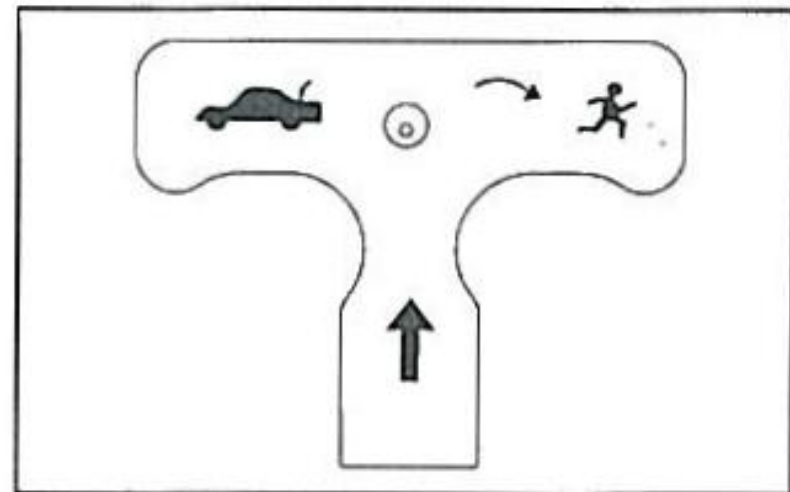
You can also open the trunk from inside the vehicle.

 **(Remote Trunk Release):** Press the button with the open trunk symbol on it. The button is located next to the exterior lamps control on the left side of the instrument panel. The shift lever must be in PARK (P) for the remote trunk release button to work.

If your vehicle ever loses power, you can open the trunk by lowering the rear seat and pulling the emergency trunk release handle located inside the trunk. See *Split Folding Rear Seat* on page 1-10 and "Emergency Trunk Release Handle" following.

Emergency Trunk Release Handle

Notice: Do not use the emergency trunk release handle as a tie-down or anchor point when securing items in the trunk as it could damage the handle. The emergency trunk release handle is only intended to aid a person trapped in a latched trunk, enabling them to open the trunk from the inside.



There is a glow-in-the-dark trunk release handle located on the latch inside the trunk. This handle will glow following exposure to light. Pull the release handle to open the trunk from the inside.