



Occupant Protection - Compartment Door Latching

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. To determine if interior compartment door performances are consistent with the requirements of:

- Federal Motor Vehicle Safety Standard (FMVSS) Number 201. (FMVSS 201).
- Canada Motor Vehicle Safety Standard (CMVSS) Number 201. (CMVSS 201).
- Korea Motor Vehicle Safety Standard (KMVSS) Number 111-3. (KMVSS 111-3).

1.2 Applicability. Passenger vehicles, light-duty trucks and buses with a Gross Vehicle Mass Rating (GVMR) of 4536 kg (10 000 lb) or less.

1.3 Remarks.

1.3.1 This test can be used to assure that all interior compartment doors will not inadvertently open when exposed to a $\pm 10G$ inertia load along vertical and transverse axis and $\pm 30G$ inertia load along longitudinal axis of the vehicle.

1.3.2 This standard contains only the interior compartment door performance tests associated with the requirements of CMVSS 201, FMVSS 201 and KMVSS 111-3. Related procedures are GMW14416 for instrument panel impact and console armrest performance tests and GMW14412 for seatback impact tests.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

CMVSS 201	KMVSS 111-3	SAE J850A
FMVSS 201	SAE J839B	

2.2 GM Standards/Specifications.

GMW14412	GMW14416	GMW14529 (ID)	GMW15474 (ID)
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Note: (ID) = This standard is limited to internal distribution within General Motors and shall not be distributed outside this company. Contact the GM Lead Engineer for further instructions.

2.3 Additional References.

- Auros Active Knowledge System.
- Automotive Regulation Information Database.
- Best Practice form in K-PAC INTMECH-23, Checklist for Glove Box latch (Latch Calculation). The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.
- Best Practice form in K-PAC INTMECH-36, Checklist for Armrest (calculations for the system). The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.
- Details, assembly drawings, math data or manufacturer's published information of interior compartment door latching mechanism(s).
- Electronic file.
- Safety Regulations and Certification.

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- Subsystem Technical Specification.
- Vehicle Technical Specification.

3 Resources

3.1 Facilities. Applicable to 4.3.1: GM barrier test facility such as the one at the GM Proving Ground in Milford, Michigan.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment.

3.2.1 When testing hardware by dynamic tests:

- The interior compartment door(s) and latching mechanism(s) are required along with its environmental structure or complete vehicle.
- A barrier test facility meeting the requirements of SAE J850A, Barrier Collision Test.

Note: All instrumentation is to be calibrated as required, record instrumentation details and date of calibration on Data Sheet A1 in Appendix A, unless the information is otherwise preserved in the testing facility records.

3.2.2 When testing by analytical calculations:

- Details, assembly drawings and the mass of interior compartment door latching mechanism(s). The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.3 Test Vehicle/Test Piece. Not applicable.

3.4 Test Time.

Calendar time: 2 days

Test hours: 8 h

Coordination hours: 16 h

Note: This test is usually run with the 48 km/h (30 mph) barrier test. The effect on the test duration should be factored into any consideration for critical path timing.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Not applicable.

3.7 Development/Validation Items. Interior compartment door latching systems.

Note: There are other aspects of interior compartment doors not being validated by this testing and analysis procedure.

4 Procedure

4.1 Preparation. Interior compartment door latching retention capability must be demonstrated by an inertia load analytical calculation of 10G in the horizontal transverse and vertical directions in addition to one of the following procedures:

- An inertia load analytical calculation of 30G in a horizontal longitudinal direction
- A 48 km/h (30 mph) full frontal fixed barrier impact barrier.

Analytical calculations shall be completed for all regulations and must be performed in accordance with SAE recommended practice J839B Passenger Car Side Door Latch Systems Section 6: Inertia Analysis (previously designated as Section 5 in preceding versions of SAE J839B).

Note: When determining the effects of horizontal transverse accelerations, it will be necessary to investigate both lateral directions unless it can be demonstrated that the latch system is laterally symmetrical or loaded in only one direction.

4.2 Conditions. For analysis, not specified. For testing, reference GMW14529.

4.2.1 Environmental Conditions. Not applicable.

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4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions.

4.3.1 Barrier Test - Test Procedure.

4.3.1.1 Install interior compartment door(s) and latch(es) in a representative vehicle in accordance with the manufacturer's specifications.

4.3.1.2 Install on-board high speed motion picture camera(s) to record the action on the interior compartment door(s).

4.3.1.3 Impact the vehicle perpendicularly into a fixed collision barrier at a longitudinal velocity of at least 48 km/h (30 mph) per GMW14529, 48 km/h (30 mph) barrier impacts.

4.3.1.4 Record test results on Data Sheet A2.

5 Data

5.1 Calculations.

5.1.1 Glove Box Corporate Common Component Dual Pawl Latch. Perform calculation using Best Practice form in K-PAC INTMECH-23, Checklist for Glove Box latch (Latch Calculation), in the Auros Active Knowledge System. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

5.1.2 Floor Console Armrest Latch. Perform calculation using Best Practice form in K-PAC INTMECH-36, Checklist for Armrest (calculations for the system), in the Auros Active Knowledge System. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

5.1.3 Other Interior Latched Compartments. Perform analytical inertia calculations per SAE J839B. Determine the following characteristics for each active component in the door latch within the plane of acceleration from drawings, math data, or manufacturer's published information:

- Location and orientation.
- Pivot center or line of motion.
- Center of gravity location.

5.1.3.1 Calculate the forces and/or moments imposed on each of the active components and indicate them in a free body diagram stored in an electronic file. Calculations are to be performed using the following accelerations:

- 10G horizontal transverse.
- 10G vertical.
- 30G horizontal longitudinal.

5.1.3.2 Indicate in the electronic file any spring forces imposed by a minimum output spring.

5.1.3.3 Assign a sign convention to all forces and/or moments and through a summation of all forces and/or moments determine whether the door(s) will unlatch when subjected independently to each of the transverse, vertical and longitudinal accelerations. Record the information on Data Sheet A3.

5.2 Interpretation of Results.

5.2.1 Legal Requirements. The Federal, Canada, and Korea Motor Vehicle Safety Standards (FMVSS, CMVSS, and KMVSS) requirements in 5.2 are given only for convenience and may have been summarized from the Automotive Regulation Information Database, as published by Safety Regulations and Certification. This database contains the most recent statement of regulatory requirements and supercedes those in this section. Guidance for interpreting FMVSS, CMVSS, and KMVSS requirements may be obtained from Safety Regulations and Certification. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

5.2.2 Reference Vehicle Technical Specifications or Subsystem Technical Specifications for final judgment of compliance, the measurement units (whether International System of Units (SI) metric, non-SI metric or otherwise) specified in the governmental requirement should be used.

5.2.3 To avoid having the test speed be below that specified in the governmental requirement, the test target speed should be selected taking into account speed control and measurement systems accuracies.

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