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## Standards and Regulations Division

### TECHNICAL STANDARDS DOCUMENT

No. 206, Revision 1

# Door Locks and Door Retention Components

The text of this document is based on Federal Motor Vehicle Safety Standard No. 206, Door locks and door retention components, as published in the U.S. *Code of Federal Regulations*, Title 49, Part 571, revised as of October 1, 2005, and the Notice of proposed rulemaking published in the *Federal Register* on December 15, 2004 (Vol. 69, No. 240, p. 75020).

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# Technical Standards Document Number 206, Revision 1

## Door Locks and Door Retention Components

*(Ce document est aussi disponible en français.)*

### Introduction

As defined by section 12 of the *Motor Vehicle Safety Act*, a Technical Standards Document (TSD) is a document that reproduces an enactment of a foreign government (e.g. a Federal Motor Vehicle Safety Standard issued by the U.S. National Highway Traffic Safety Administration). According to the Act, the *Motor Vehicle Safety Regulations* may alter or override some provisions contained in a TSD or specify additional requirements; consequently, it is advisable to read a TSD in conjunction with the Act and its counterpart Regulation. As a guide, where the corresponding Regulation contains additional requirements, footnotes indicate the amending subsection number.

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### Identification of Changes

In order to facilitate the incorporation of a TSD, certain non-technical changes may be made to the foreign enactment. These may include the deletion of words, phrases, figures, or sections that do not apply under the Act or Regulations, the conversion of imperial to metric units, the deletion of superseded dates, and minor changes of an editorial nature. Additions are underlined, and provisions that do not apply are ~~stroked through~~. Where an entire section has been deleted, it is replaced by: “[CONTENT DELETED]”. Changes are also made where there is a reporting requirement or reference in the foreign enactment that does not apply in Canada. For example, the name and address of the U.S. Department of Transportation are replaced by those of the Department of Transport.

### Effective Date and Compliance Date

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<sup>1</sup> Please see subsections 206(1) to (3) of the *Motor Vehicle Safety Regulations* for additional requirements.

**Official Version of Technical Standards Documents**

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(Original signed by)

Director, Standards Research and Development  
for the Minister of Transport, Infrastructure  
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## DOOR LOCKS AND DOOR RETENTION COMPONENTS

The text of this document is based on Federal Motor Vehicle Safety Standard No. 206, Door Locks and Door Retention Components, as published in the *U.S. Code of Federal Regulations*, Title 49, Part 571, and the Notice of Proposed Rulemaking published in the *Federal Register* on December 15, 2004 (Vol. 69, No. 240, p. 75020).

### S1. Scope and Purpose

This Technical Standards Document (TSD) regulation specifies requirements for vehicle door locks and door retention components, including latches, hinges, and other supporting means, to minimize the likelihood of occupants being ejected from a vehicle as a result of impact.

### S2. Application

[CONTENT DELETED] For applicability, see Schedule III and subsections 206(1) to (3) of Schedule IV to the *Motor Vehicle Safety Regulations*.

### S3. Definitions

**Auxiliary door latch** is a latch equipped with a fully latched position and fitted to a door or door system equipped with a primary door latch system. (*Loquet auxiliaire de porte*)

**Auxiliary door latch system** consists, at a minimum, of an auxiliary door latch and a striker. (*Système de fermeture auxiliaire de porte*)

~~\* **Back door** is a door or door system on the back end of a motor vehicle through which passengers can enter or depart the vehicle or cargo can be loaded or unloaded. It does not include:~~

~~(a) A trunk lid; or~~

~~(b) A door or window composed entirely of glazing material and whose latches and/or hinge systems are attached directly to the glazing material.~~

~~(Porte arrière)~~

**Body member** is that portion of the hinge normally affixed to the body structure. (*Membre de carrosserie*)

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\* Please see subsection 2(1) of the *Motor Vehicle Safety Regulations* for the applicable definition.

**Door closure warning system** is a system that will activate a visual signal located where it can be clearly seen by the driver when a door latch system is not in its fully latched position and while the vehicle ignition is activated. (*Système d'avertissement de fermeture de porte*)

**Door hinge system** is one or more hinges used to support a door. (*Système de charnières de porte*)

**Door latch system** consists, at a minimum, of a latch and a striker. (*Système de fermeture de porte*)

**Door member** is that portion of the hinge normally affixed to the door structure and constituting the swinging member. (*Membre de porte*)

**Door system** is the door, latch, striker, hinges, sliding track combinations, and other door retention components on a door and its surrounding door frame. The door system of a double door includes both doors. (*Système de porte*)

**Double door** is a system of two doors where the front door or wing door opens first and connects to the rear door or bolted door, which opens second. (*Porte double*)

**Folding door** is a movable barrier, which will close off an entranceway to a bus, multipurpose passenger vehicle, or truck, consisting of two or more hinge panels that swing, slide, or rotate; does not have a striker and latch assembly; and is normally controlled from a location adjacent to the vehicle's driver seat. (*Porte pliante*)

**Force application zone** is defined by a rectangular area on the door or rear hatch bounded by the projection onto the door or hatch exterior of two vertical lines, 25 mm on either side of the right or left edges of the exterior handle or the latch release handle, and the projection of two horizontal lines 10 mm and 110 mm below the lowest point of the exterior door handle or the latch release handle. In the event that there is insufficient space below the release handle, the force application zone shall be located above the release handle. (*Zone d'application de force*)

**Fork-bolt** is the part of the latch that engages and retains the striker when in a latched position. (*Fourchette de loquet*)

**Fork-bolt opening direction** is the direction opposite to that in which the striker enters the latch to engage the fork-bolt. (*Direction d'ouverture de la fourchette de loquet*)

**Fully latched position** is the coupling condition of the latch that retains the door in a completely closed position. (*Position de fermeture complète*)

**Hinge** is a device system used to position the door relative to the body structure and control the path of the door swing for passenger ingress and egress. (*Charnière*)

**Hinge pin** is that portion of the hinge normally interconnecting the body and door members and establishing the swing axis. (*Axe de charnière*)

**Latch** is a device employed to maintain the door in a closed position relative to the vehicle body with provisions for deliberate release (or operation). (*Loquet*)

**Primary door latch** is a latch equipped with both a fully latched position and a secondary latched position. (*Loquet primaire de porte*)

**Primary door latch system** consists, at a minimum, of a primary door latch and a striker. (*Système de fermeture primaire de porte*)

**Secondary latched position** refers to the coupling condition of the latch that retains the door in a partially closed position. (*Position de fermeture intermédiaire*)

**Side front door** is a door that, in a side view, has 50 percent or more of its opening area forward of the rearmost point on the driver's seat back, when the seat back is adjusted to its most vertical and rearward position. (*Porte latérale avant*)

**Side rear door** is a door that, in a side view, has more than 50 percent or more of its opening area to the rear of the rearmost point on the driver's seat back, when the driver's seat is adjusted to its most vertical and rearward position. (*Porte latérale arrière*)

**Striker** is a device with which the latch engages to maintain the door in the fully latched or secondary latched position. (*Gâche*)

**Trunk lid** means a movable body panel that provides access from outside the vehicle to a space wholly partitioned from the occupant compartment by a permanently attached partition or a fixed or fold-down seat back. (*Couvercle de coffre*)

#### **S4. Requirements**

The requirements apply to all side and back doors and door components except for those on folding doors, roll-up doors, detachable doors, and doors that are designated to provide emergency egress.

##### **S4.1 Hinged Doors**

**S4.1.1 Primary Door Latch System.** Each hinged door system shall be equipped with at least one primary door latch system.

###### **S4.1.1.1 Load Test One**

- (a) Each primary door latch system and auxiliary door latch system, when in the fully latched position, shall not separate when a load of 11,000 N is applied in the direction perpendicular to the face of the latch such that the latch and the striker anchorage are not compressed against each other, when tested in accordance with S5.1.1.1.
- (b) When in the secondary latched position, the primary door latch system shall not separate when a load of 4,500 N is applied in the same direction specified in paragraph (a) of this section when demonstrated in accordance with S5.1.1.1.

**S4.1.1.2 Load Test Two**

- (a) Each primary door latch system and auxiliary door latch system, when in the fully latched position, shall not separate when a load of 9,000 N is applied in the fork-bolt opening direction and parallel to the face of the latch, when demonstrated in accordance with S5.1.1.2.
- (b) When in the secondary latched position, the primary door latch system shall not separate when a load of 4,500 N is applied in the same direction specified in paragraph (a) when demonstrated in accordance with S5.1.1.2.

**S4.1.1.3 Load Test Three.** Each primary door latch system on back doors shall not disengage from the fully latched position when a load of 9,000 N is applied in a direction orthogonal to the directions specified in S4.1.1.1 and S4.1.1.2 when tested in accordance with S5.1.1.3.

**S4.1.1.4 Inertial Load.** Each primary door latch system and auxiliary door latch system shall meet either the dynamic requirements specified in paragraphs (a) and (b) of this section or the calculation of inertial load resistance specified in paragraph (c) of this section.

- (a) Each primary door latch and auxiliary door latch on each hinged door shall not disengage from the fully latched position when an inertial load of 30 g is applied to the door latch system, including the latch and its activation device, in the directions parallel to the vehicle's longitudinal and transverse axes with the locking device disengaged and when demonstrated in accordance with S5.1.1.4.
- (b) Each primary door latch and auxiliary door latch on each hinged back door shall also not disengage from the fully latched position when an inertial load of 30 g is applied to the door latch system, including the latch and its activation device, in the direction parallel to the vehicle's vertical axis with the locking device disengaged and when demonstrated in accordance with S5.1.1.4.
- (c) Each component or subassembly can be calculated for its minimum inertial load resistance in a particular direction. The combined resistance to the unlatching operation must assure that the door latch system, when properly assembled in the vehicle door, will remain latched when subjected to an inertial load of 30 g in the vehicle directions specified in paragraph (a) or (b) of this section, as applicable, when demonstrated in accordance with S5.1.1.4(a).

**S4.1.2 Door Hinges**

**S4.1.2.1** When tested in accordance with S5.1.2, each door hinge system shall

- (a) Support the door,
- (b) Not separate when a longitudinal load of 11,000 N is applied,
- (c) Not separate when a transverse load of 9,000 N is applied, and
- (d) Not separate when a vertical load of 9,000 N is applied.



**S4.1.2.2** If a single hinge within the hinge system is tested instead of the entire hinge system, the hinge must bear a load proportional to the total number of hinges in the hinge system.

**S4.1.2.3** On side doors with rear mounted hinges that can be operated independently of other doors,

- (a) The interior door handle shall be inoperative when the speed of the vehicle is greater than or equal to 4 km/h, and
- (b) A door closure warning system shall be provided for those doors.

## **S4.2 Sliding Side Doors**

**S4.2.1 Latch System.** Each sliding door system shall be equipped with either:

- (a) At least one primary door latch system, or
- (b) A door latch system with a fully latched position and a door closure warning system.

### **S4.2.1.1 Load Test One**

- (a) At least one door latch system, when in the fully latched position, shall not separate when a load of 11,000 N is applied in the direction perpendicular to the face of the latch when tested in accordance with S5.2.1.1.
- (b) In the case of a primary door latch system, when in the secondary latched position, the door latch system shall not separate when a load of 4,500 N is applied in the same direction when tested in accordance with S5.2.1.1.

### **S4.2.1.2 Load Test Two**

- (a) At least one door latch system, when in the fully latched position, shall not separate when a load of 9,000 N is applied in the fork-bolt opening direction and parallel to the face of the latch when tested in accordance with S5.2.1.2.
- (b) In the case of a primary door latch system, when in the secondary latched position, the door latch system shall not separate when a load of 4,500 N is applied in the same direction when tested in accordance with S5.2.1.2.

**S4.2.1.3 Inertial Load.** Each door latch system certified as meeting the requirements of S4.2.1.1 and S4.2.1.2 shall meet either the dynamic requirements specified in paragraph (a) of this section or the calculation of inertial load resistance specified in paragraph (b) of this section.

- (a) The door latch system shall not disengage from the fully latched position when an inertial load of 30 g is applied to the door latch system, including the latch and its activation mechanism, in the directions parallel to the vehicle's longitudinal and transverse axes with the locking mechanism disengaged and when tested in accordance with 5.2.1.4.
- (b) The minimum inertial load resistance can be calculated for each component or subassembly. Their combined resistance to the unlatching operation must assure that

the door latch system, when properly assembled in the vehicle door, will remain latched when subjected to an inertial load of 30 g in the vehicle directions specified in S4.2.1.1 or S4.2.1.2, as applicable, when demonstrated in accordance with S5.1.1.4.

## **S4.2.2 Door System**

**S4.2.2.1** The track-and-slide combination or other supporting means for each sliding door, while in the closed, fully latched position, shall not separate from the door frame when a total force of 18,000 N along the vehicle's transverse axis is applied to the door in accordance with S5.2.2.

**S4.2.2.2** The sliding door, when tested in accordance with S5.2.2, fails the requirement of S4.2.2.1 if any one of the following occurs:

- (a) A separation between the interior of the door and the exterior edge of the door frame exceeds 100 mm, while the required force is maintained.
- (b) Either force application device reaches a total displacement of 300 mm.

## **S4.3 Door Locks**

Each door shall be equipped with at least one locking device which, when engaged, shall prevent operation of the exterior door handle or other exterior latch release control and which has an operating means and a lock release/engagement device located within the interior of the vehicle.

### **S4.3.1 Rear Side Doors**

Each rear side door shall be equipped with at least one locking device which has a lock release/engagement mechanism located within the interior of the vehicle and which is readily accessible to the driver of the vehicle or an occupant seated adjacent to the door, and which, when engaged, prevents operation of the interior door handle or other interior latch release control and requires separate actions to unlock the door and operate the interior door handle or other interior latch release control.

### **S4.3.2 Back Doors**

Each back door equipped with an interior door handle or other interior latch release control shall be equipped with at least one locking device that meets the requirements of S4.3.1.

## **S5. Test Procedures**

### **S5.1 Hinged Doors**

#### **S5.1.1 Primary Door Latches**

**S5.1.1.1 Load Test One Force Application.** Compliance with S4.1.1.1 and S4.2.1.1 is demonstrated in accordance with the following:

(a) *Fully Latched Position*

- (1) Adapt the test fixture shown in Figure 1 to the mounting provisions of the latch and striker. Align the direction of engagement parallel to the linkage of the fixture. Mount the latch and striker in the fully latched position to the test fixture.
- (2) Locate weights to apply a 900-N load tending to separate the latch and striker in the direction of the door opening.
- (3) Apply the test load, in the direction specified in S4.1.1.1 and Figure 4, at a rate not to exceed 5 mm/min until the required load has been achieved. Record the maximum load achieved.

(b) *Secondary Latched Position*

- (1) Adapt the test fixture shown in Figure 1 to the mounting provisions of the latch and striker. Align the direction of engagement parallel to the linkage of the fixture. Mount the latch and striker in the secondary latched position to the test fixture.
- (2) Locate weights to apply a 900-N load tending to separate the latch and striker in the direction of the door opening.
- (3) Apply the test load, in the direction specified in S4.1.1.1 and Figure 4, at a rate not to exceed 5 mm/min until the required load has been achieved. Record maximum load achieved.
- (4) The test plate on which the door latch is mounted will have a striker cut-out configuration similar to the environment in which the door latch will be mounted on normal vehicle doors.

**S5.1.1.2 Load Test Two Force Application.** Compliance with S4.1.1.2 and S4.2.1.2 is demonstrated in accordance with the following:

(a) *Fully Latched Position*

- (1) Adapt the test fixture shown in Figure 2 to the mounting provisions of the latch and striker. Mount the latch and striker in the fully latched position to the test fixture.
- (2) Apply the test load, in the direction specified in S4.1.1.2 and Figure 4, at a rate not to exceed 5 mm/min until the required load has been achieved. Record the maximum load achieved.

(b) *Secondary Latched Position*

- (1) Adapt the test fixture shown in Figure 2 to the mounting provisions of the latch and striker. Mount the latch and striker in the secondary latched position to the test fixture.
- (2) Apply the test load, in the direction specified in S4.1.1.2 and Figure 4, at a rate not to exceed 5 mm/min until the required load has been achieved. Record the maximum load achieved.

**S5.1.1.3 Load Test Three Force Application.** Compliance with S4.1.1.3 is demonstrated in accordance with the following:

- (a) Adapt the test fixture shown in Figure 3 to the mounting provisions of the latch and striker. Mount the latch and striker in the fully latched position to the test fixture.
- (b) Apply the test load, in the directions specified in S4.1.1.3 and Figure 4, at a rate not to exceed 5 mm/min until the required load has been achieved. Record the maximum load required.

**S5.1.1.4 Inertial Force Application.** Compliance with S4.1.1.4 and S4.2.1.3 is demonstrated in accordance with either paragraph (a) or (b) of this section.

- (a) *Calculation.* Compliance shall be demonstrated in accordance with paragraph 6 of Society of Automotive Engineers Recommended Practice J839, *Passenger Car Side Door Latch Systems*, June 1991.
- (b) *Dynamic Test*

**(1) Test Setup and Directions for Full Vehicle Test**

(i) *Test Setup*

- (A) Rigidly secure the full vehicle to an acceleration device that, when accelerated together, will assure that all points on the crash pulse curve are within the corridor defined in Table 1 and Figure 5.
- (B) Install the equipment used to record door opening (doors may be tethered to avoid damaging the recording equipment).
- (C) Close the door(s) to be tested and ensure that the door latch(es) is in the fully-latched position, that the door(s) is unlocked, and that all windows, if provided, on the door(s) are closed.

(ii) *Test Directions* (See Figure 6)

- (A) Longitudinal Setup 1. Orient the vehicle so that its longitudinal axis is aligned with the axis of the acceleration device, simulating a frontal impact.
- (B) Longitudinal Setup 2. Orient the vehicle so that its longitudinal axis is aligned with the axis of the acceleration device, simulating a rear impact.
- (C) Transverse Setup 1. Orient the vehicle so that its transverse axis is aligned with the axis of the acceleration device, simulating a driver-side impact.
- (D) Transverse Setup 2. (Only for vehicles having different door arrangements on each side.) Orient the vehicle so that its transverse axis is aligned with the axis of the acceleration device, simulating a side impact in the direction opposite to that described in paragraph (C).

**(2) Test Setup and Directions for Door Test****(i) Test Setup**

- (A) Mount the door assemblies, consisting of at least the door latch(es), exterior door handle(s) with mechanical latch operation, interior door opening lever(s), and locking device(s), either separately or combined to a test fixture. Each door and striker shall be mounted to the test fixture to correspond to its orientation on the vehicle and to the directions specified in paragraph (b)(1)(ii) of this section.
- (B) Mount the test fixture to the acceleration device and install the equipment used to record door opening.
- (C) Ensure that the door latch is in the fully-latched position, that the door is tethered and unlocked, and that any windows are closed.

**(ii) Test Directions** (See Figure 6)

- (A) Longitudinal Setup 1. Orient the door subsystem(s) on the acceleration device in the direction of a frontal impact.
- (B) Longitudinal Setup 2. Orient the door subsystem(s) on the acceleration device in the direction of a rear impact.
- (C) Transverse Setup 1. Orient the door subsystem(s) on the acceleration device in the direction of a driver-side impact.
- (D) Transverse Setup 2. Orient the door subsystem(s) on the acceleration device in the direction opposite to that described in paragraph (C).
- (E) Vertical Setup 1 (back doors only). Orient the door subsystem(s) on the acceleration device so that its vertical axis (when mounted in the vehicle) is aligned with the axis of the acceleration device, simulating a rollover impact where the force is applied in the direction from the top to the bottom of the door (when mounted in a vehicle).
- (F) Vertical Setup 2 (back doors only). Orient the door subsystem(s) on the acceleration device so that its vertical axis (when mounted in the vehicle) is aligned with the axis of the acceleration device, simulating a rollover impact where the force is applied in the direction opposite to that described in paragraph (b)(2)(ii)(E) of this section.

**(3) Test Operation**

- (i) Maintaining a minimum acceleration level of 30 g for a period of at least 30 ms, while keeping the acceleration within the pulse corridor defined in Table 1 and Figure 5, accelerate the acceleration device in the following directions:
  - (A) For Full Vehicle Tests, in the directions specified in S5.1.1.4(b)(1)(ii)(A) through S5.1.1.4(b)(1)(ii)(D).

- (B) For Door Tests, in the directions specified in S5.1.1.4(b)(2)(i)(A) through S5.1.1.4(b)(2)(i)(F).
- (ii) Check the recording device for door opening and/or closure during the test.
- (iii) If, at any point in time, the pulse exceeds 36 g and the test requirements are fulfilled, the test shall be considered valid.

**S5.1.2 Door Hinges.** Compliance with S4.1.2 is demonstrated in accordance with the following:

#### **S5.1.2.1 Multiple Hinge Evaluation**

##### **S5.1.2.1.1 Longitudinal Load Test**

- (a) Attach the hinge system to the mounting provision of the test fixture illustrated in Figure 7. Hinge attitude must simulate vehicle position (door fully closed) relative to the hinge centreline. For test purposes, the distance between the extreme end of one hinge in the system to the extreme opposite end of another hinge in the system is to be set at  $406 \text{ mm} \pm 4 \text{ mm}$ . The load is to be applied equidistant between the linear centre of the engaged portions of the hinge pins and through the centreline of the hinge pin in the longitudinal vehicle direction (see figure 8).
- (b) Apply the test load at a rate not to exceed 5 mm/min until the required load has been achieved. Record the maximum load achieved.

##### **S5.1.2.1.2 Transverse Load Test**

- (a) Attach the hinge system to the mounting provisions of the test fixture illustrated in figure 7. Hinge attitude must simulate vehicle position (door fully closed) relative to the hinge centreline. For test purposes, the distance between the extreme end of one hinge in the system to the extreme opposite end of another hinge in the system is to be set at  $406 \text{ mm} \pm 4 \text{ mm}$ . The load is to be applied equidistant between the linear centre of the engaged portions of the hinge pins and through the centreline of the hinge pin in the transverse vehicle direction (see figure 8).
- (b) Apply the test load at a rate not to exceed 5 mm/min until the required load has been achieved. Record the maximum load achieved.

##### **S5.1.2.2 Vertical Load Test (back doors only)**

- (a) Attach the hinge system to the mounting provisions of the test fixture illustrated in figure 7. Hinge attitude must simulate vehicle position (door fully closed) relative to the hinge centreline. For test purposes, the distance between the extreme end of one hinge in the system to the extreme opposite end of another hinge in the system is to be set at  $406 \text{ mm} \pm 4 \text{ mm}$ . The load is to be applied through the centreline of the hinge pin in a direction orthogonal to the longitudinal and transverse loads (see figure 8).
- (b) Apply the test load at a rate not to exceed 5 mm/min until the required load has been achieved. Failure consists of a separation of either hinge. Record the maximum load achieved.

**S5.1.2.3 Single Hinge Evaluation.** In some circumstances, it may be necessary to test the individual hinges of a hinge system. In such cases, the results for an individual hinge, when tested in accordance with the procedures below, shall be such as to indicate that the system requirements in S4.1.2 are met. (For example, an individual hinge in a two-hinge system must be capable of withstanding 50 percent of the load requirements of the total system.)

- (a) *Longitudinal Load.* Attach the hinge system to the mounting provision of the test fixture illustrated in figure 7. Hinge attitude must simulate the vehicle position (door fully closed) relative to the hinge centreline. For test purposes, the load is to be applied equidistant between the linear centre of the engaged portions of the hinge pin and through the centreline of the hinge pin in the longitudinal vehicle direction. Apply the test load at a rate not to exceed 5 mm/min until the required load has been achieved. Failure consists of a separation of ~~either~~ the hinge. Record the maximum load achieved.
- (b) *Transverse Load.* Attach the hinge system to the mounting provision of the test fixture illustrated in figure 7. Hinge attitude must simulate the vehicle position (door fully closed) relative to the hinge centreline. For test purposes, the load is to be applied equidistant between the linear centre of the engaged portions of the hinge pin and through the centreline of the hinge pin in the transverse vehicle direction. Apply the test load at a rate not to exceed 5 mm/min until the required load has been achieved. Failure consists of a separation of ~~either~~ the hinge. Record the maximum load achieved.
- (c) *Vertical Load.* Attach the hinge system to the mounting provision of the test fixture illustrated in figure 7. Hinge attitude must simulate the vehicle position (door fully closed) relative to the hinge centreline. For test purposes, the load is to be applied through the centreline of the hinge pin in a direction orthogonal to the longitudinal and transverse loads. Apply the test load at a rate not to exceed 5 mm/min until the required load has been achieved. Failure consists of a separation of ~~either~~ the hinge. Record the maximum load achieved.

**S5.1.2.4** For piano-type hinges, the hinge spacing requirements are not applicable and arrangement of the test fixture is altered so that the test forces are applied to the complete hinge.

## **S5.2 Sliding Side Doors**

### **S5.2.1 Door Latches**

**S5.2.1.1 Load Test One Force Application.** Compliance with S4.2.1.1 is demonstrated in accordance with the test procedures specified in S5.1.1.1.

**S5.2.1.2 Load Test Two Force Application.** Compliance with S4.2.1.2 is demonstrated in accordance with the test procedures specified in S5.1.1.2.

### **S5.2.1.3 [Reserved]**

**S5.2.1.4 Inertial Force Application.** Compliance with 4.2.1.3 is demonstrated in accordance with the test procedures specified in S5.1.1.4.

**S5.2.2 Door System.** Compliance with S4.2.2 is demonstrated in accordance with the following:

**S5.2.2.1** Tests are conducted using a full vehicle with the sliding door and its retention components.

**S5.2.2.2** The test is conducted using two force application devices capable of applying the outward transverse forces specified in S5.2.2.4. The test setup is shown in figure 9. The force application system shall include the following:

- (a) Two force application plates.
- (b) Two force application devices capable of applying the outward transverse load requirements for a minimum displacement of 300 mm.
- (c) Two load cells of sufficient capacity to measure the applied loads specified in S5.2.2.4.
- (d) Two linear displacement measurement devices required for measuring force application device displacement during the test.
- (e) Equipment for measuring at least 100 mm of separation between the interior of the door and the exterior edge of the door frame, while respecting all relevant safety and health requirements.

#### **S5.2.2.3 Test Setup**

- (a) Remove all interior trim and decorative components from the sliding door assembly.
- (b) Remove seats and any interior components that may interfere with the mounting and operation of the test equipment.
- (c) Mount the force application devices and associated support structure to the floor of the test vehicle.
- (d) Determine the forward and aft edges of the sliding door, or its adjoining vehicle structure, that contains a latch/striker.
- (e) Close the sliding door, ensuring that all door retention components are fully engaged.
- (f) For any tested door edge that contains one latch/striker, the following setup procedures are used:
  - (1) The force application plate is 150 mm in length, 50 mm in width, and at least 15 mm in thickness.
  - (2) Place the force application device and force application plate against the door so that the applied force is perpendicular to the vertical longitudinal plane that passes through the vehicle's longitudinal centreline and vertically centred on the door-mounted portion of the latch/striker.



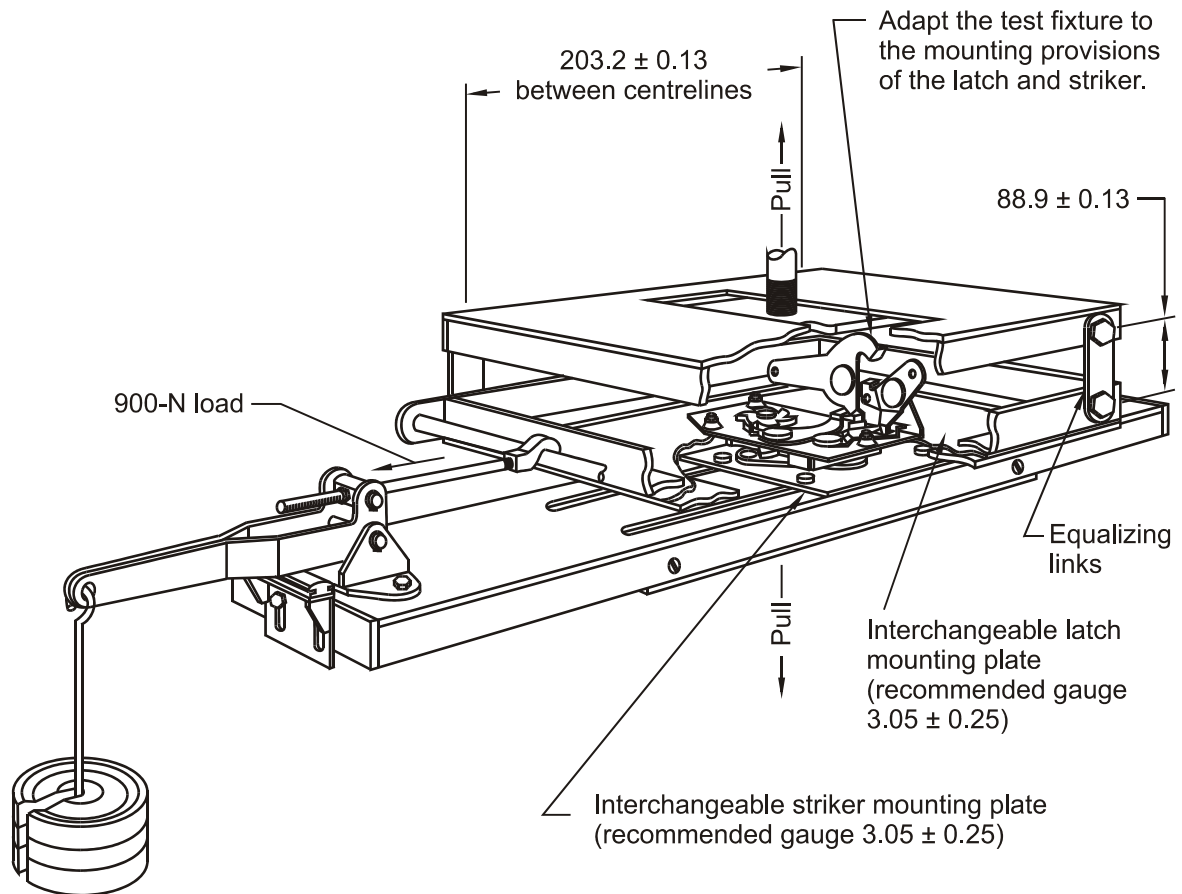
- (3) The force application plate is positioned as close to the edge of the door as possible. It is not necessary for the force application plate to be vertical.
- (g) For any tested door edge that contains more than one latch/striker, the following setup procedures are used:
  - (1) The force application plate is 300 mm in length, 50 mm in width, and at least 15 mm in thickness.
  - (2) Place the force application device and force application plate against the door so that the applied force is perpendicular to the vertical longitudinal plane that passes through the vehicle's longitudinal centreline and vertically centred on a point midway between the outermost edges of the latch/striker assemblies.
  - (3) The force application plate is positioned as close to the edge of the door as possible. It is not necessary for the force application plate to be vertical.
- (h) For any tested door edge that does not contain at least one latch/striker, the following setup procedures are used:
  - (1) The force application plate is 300 mm in length, 50 mm in width, and at least 15 mm in thickness.
  - (2) Place the force application device and force application plate against the door so that the applied force is perpendicular to the vertical longitudinal plane that passes through the vehicle's longitudinal centreline and vertically centred on a point midway along the length of the door edge, ensuring that the loading device avoids contact with the window glazing.
  - (3) The force application plate is positioned as close to the edge of the door as possible. It is not necessary for the force application plate to be vertical.
- (i) The door is unlocked. No extra fixtures or components may be welded or affixed to the sliding door or any of its components.
- (j) Attach any equipment used for measuring door separation that will be used to determine separation levels during the test procedure.
- (k) Place the load application structure so that the force application plates are in contact with the interior of the sliding door.

#### **S5.2.2.4 Test Procedure**

- (a) Move each force application device at a rate of 20 to 90 mm per minute until a force of 9,000 N is achieved on each force application device or until either force application device reaches a total displacement of 300 mm.
- (b) If one of the force application devices reaches the target force of 9,000 N prior to the other, maintain the 9,000-N force with that force application device until the second force application device reaches the 9,000-N force.
- (c) Once both force application devices have achieved 9,000 N each, stop forward movement of the force application devices and hold the resulting load for a minimum of 10 seconds.

- (d) Maintain the force application device position of paragraph (c) and measure the separation between the exterior edge of the door frame and the interior of the door along the perimeter of the door.

**S5.3 [Reserved]**



- Notes:
1. Dimensions in mm
  2. Not to scale

**Figure 1 — Door Latch: Tensile Testing Fixture for Load Test 1**

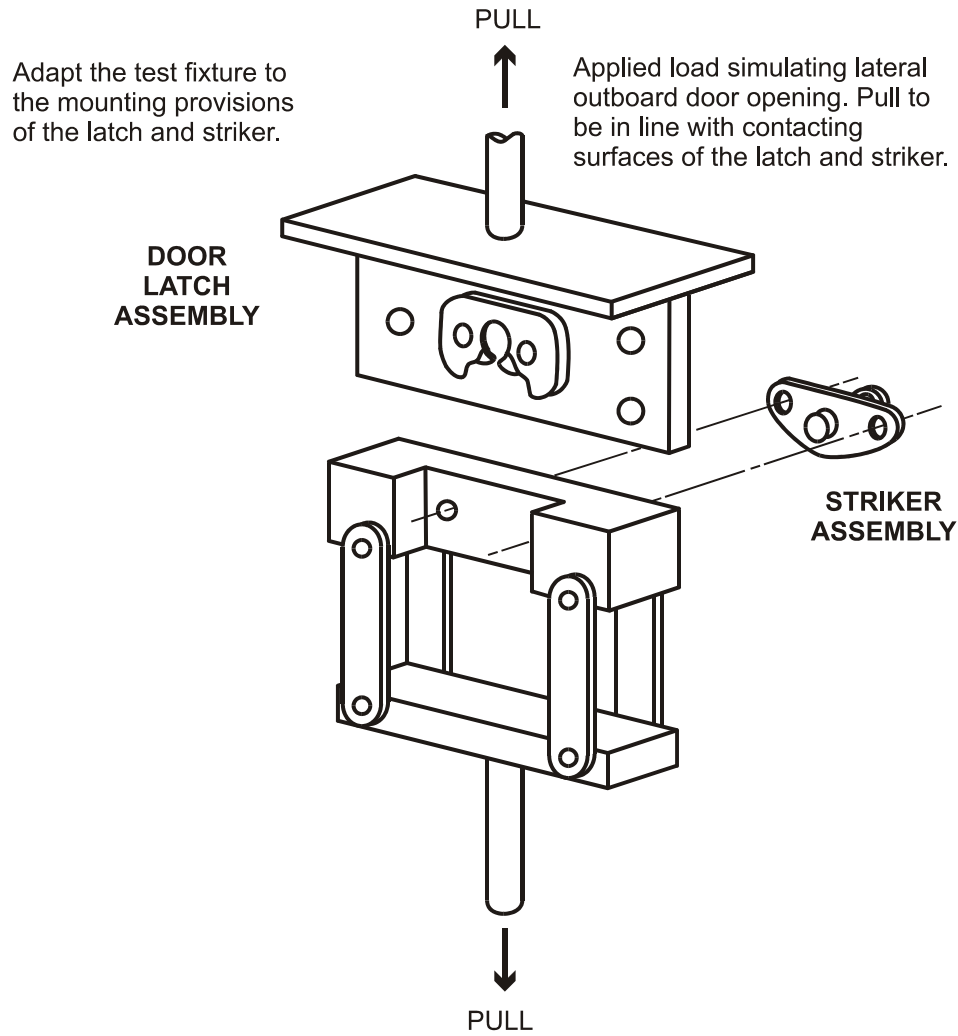
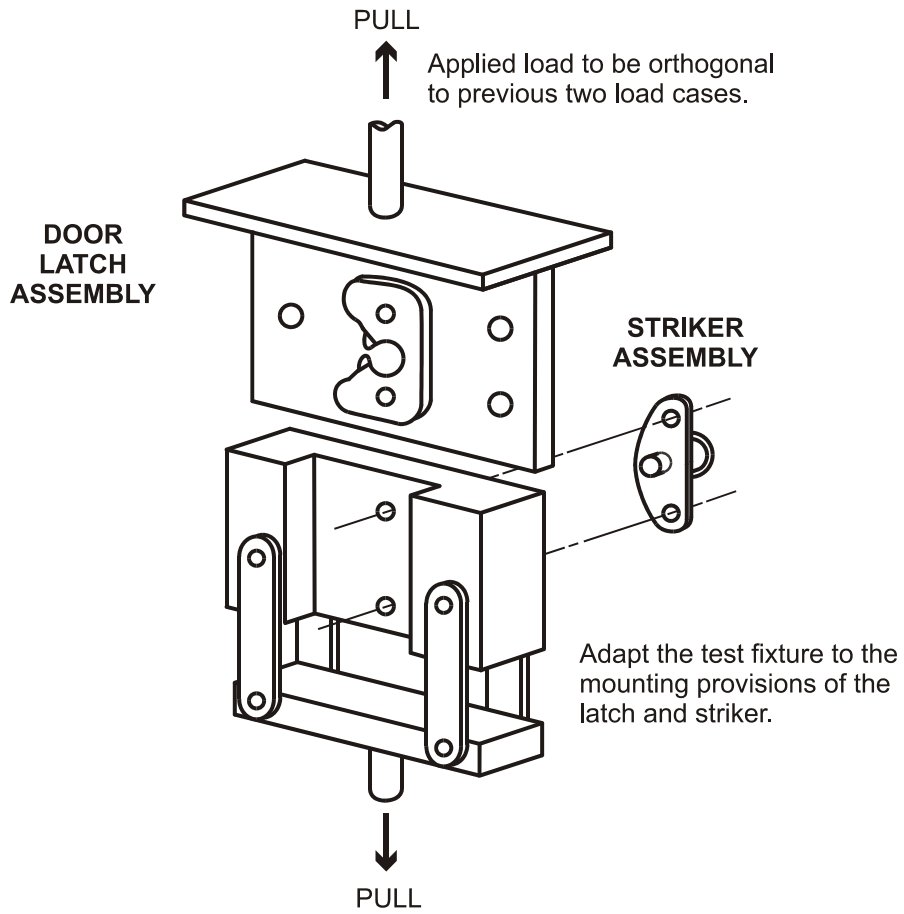


Figure 2 — Door Latch: Tensile Testing Fixture for Load Test 2



**Figure 3 — Door Latch: Tensile Testing Fixture for Load Test 3 (Back Doors Only)**

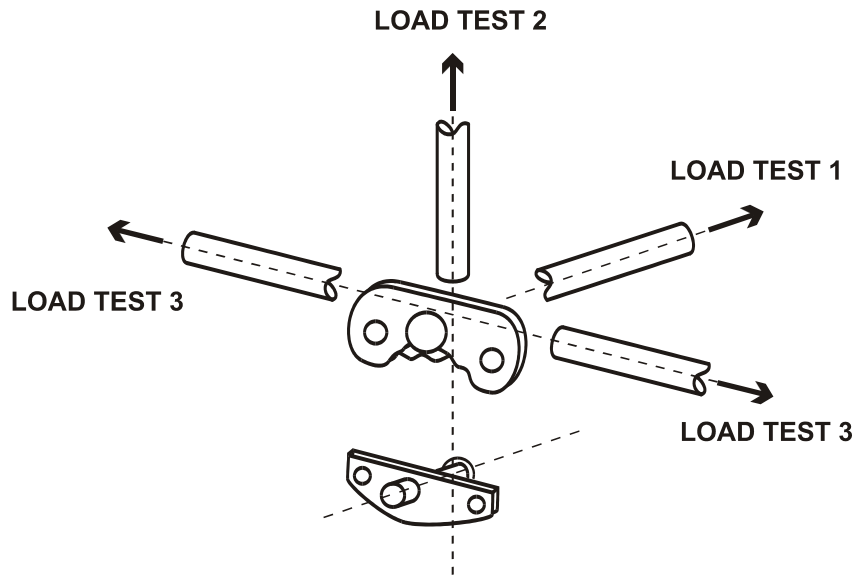


Figure 4 — Door Latch: Static Load Test Directions

Table 1 — Acceleration Pulse Corridor

Upper Bound			Lower Bound		
Point	Time (ms)	Acceleration (g)	Point	Time (ms)	Acceleration (g)
A	0	6	E	5	0
B	20	36	F	25	30
C	60	36	G	55	30
D	100	0	H	70	0

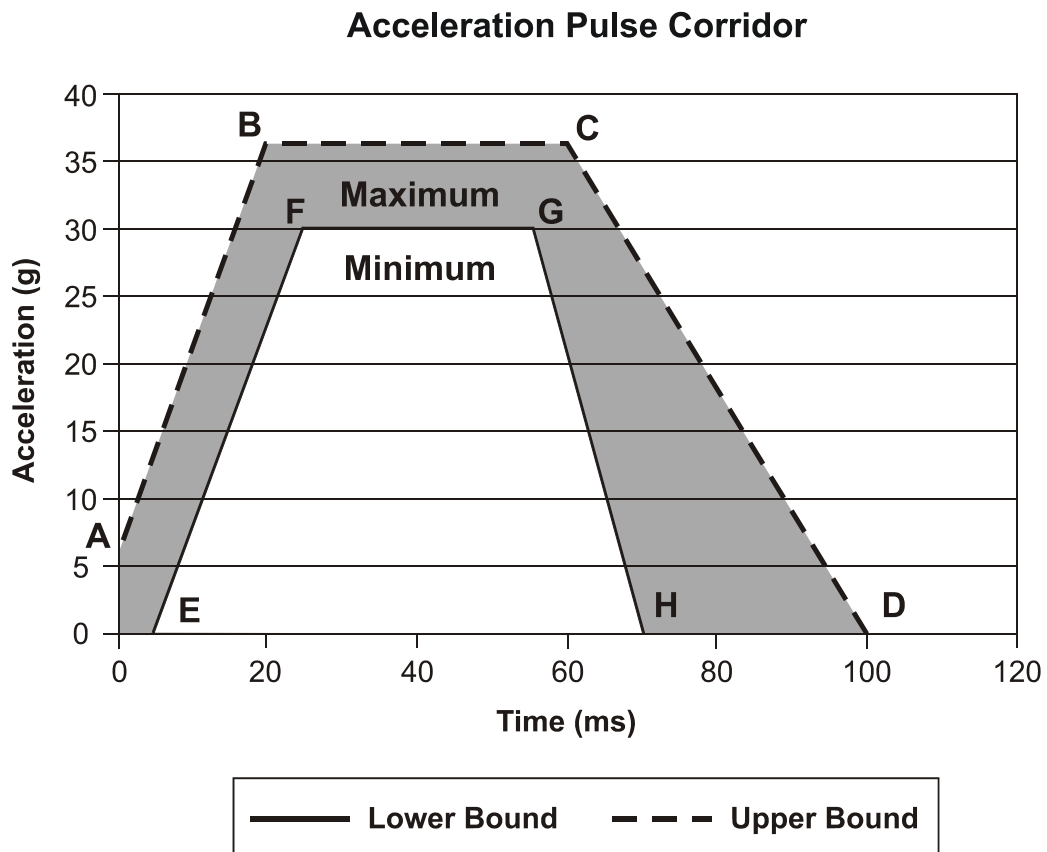
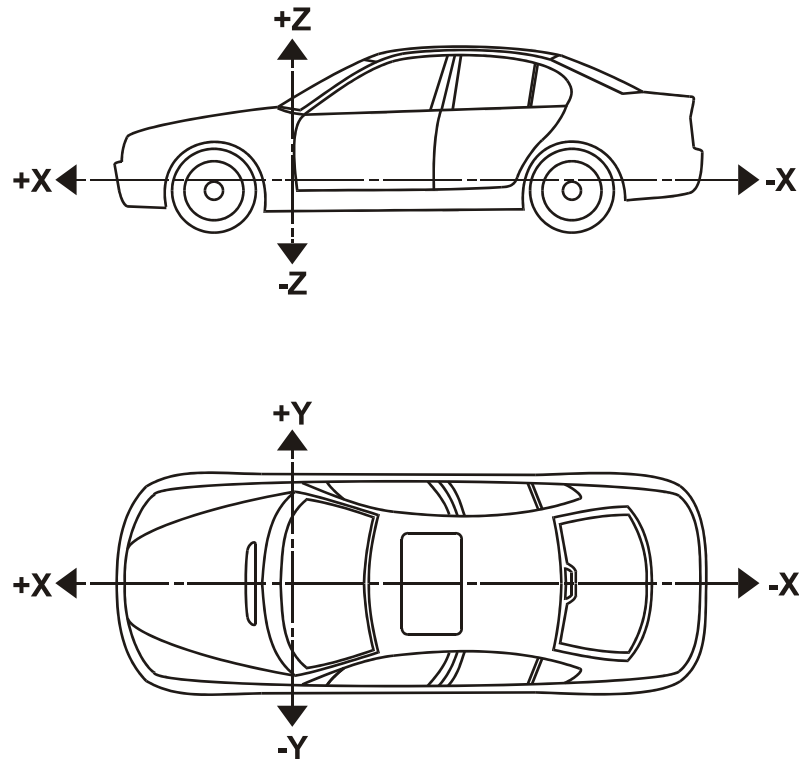


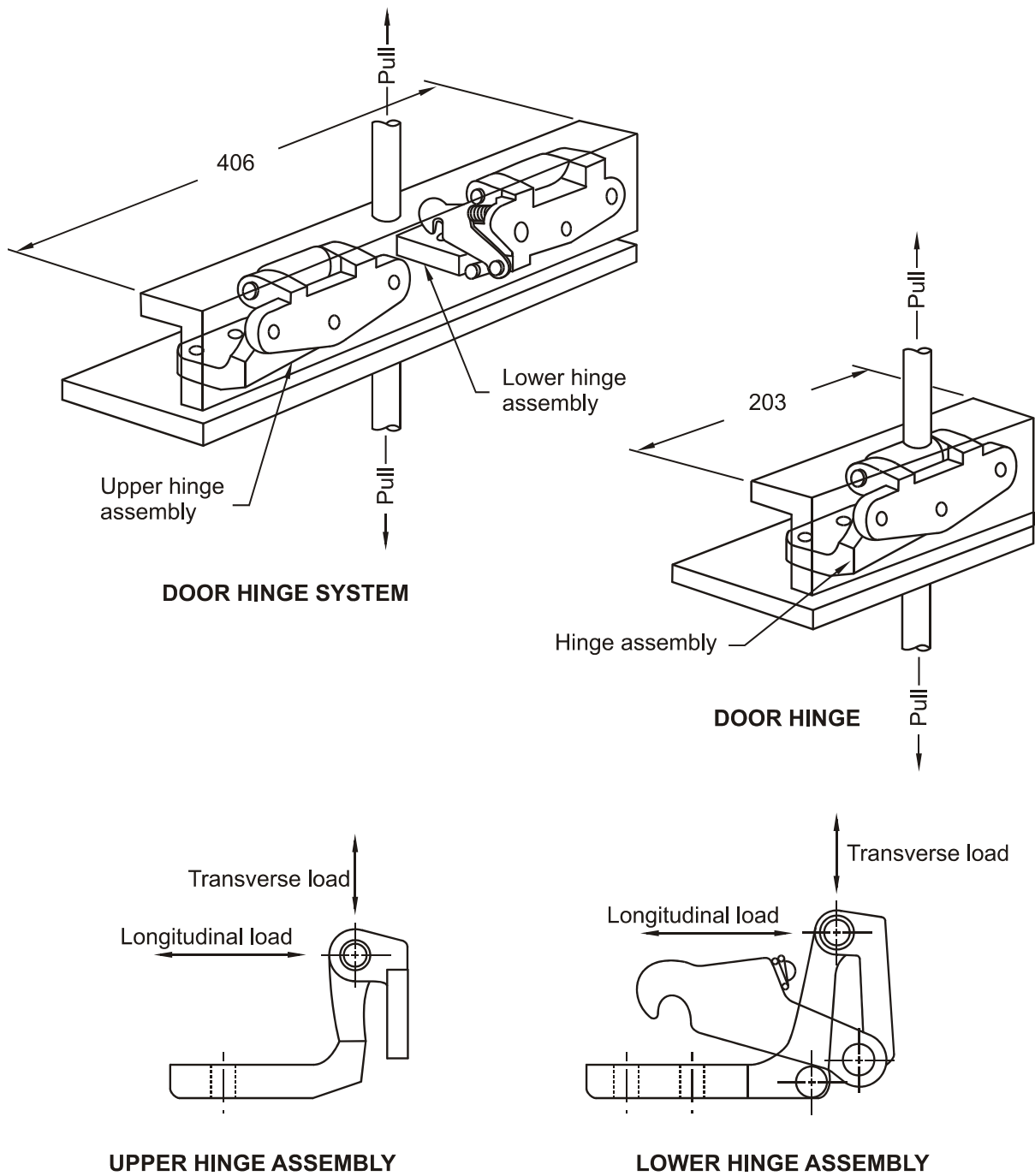
Figure 5 — Acceleration Pulse



Notes:  
X= Longitudinal direction  
Y= Transverse direction  
Z= Vertical direction

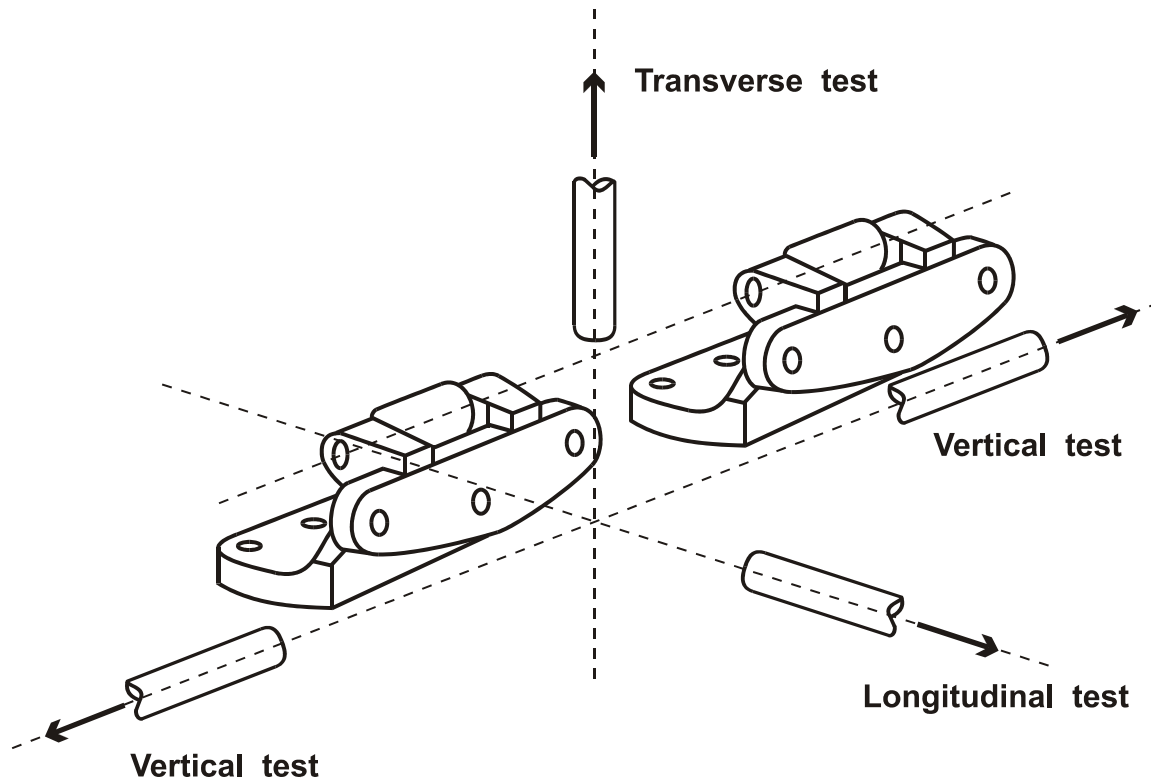
**Figure 6 — Vehicle Coordinate Reference System for Inertial Testing**





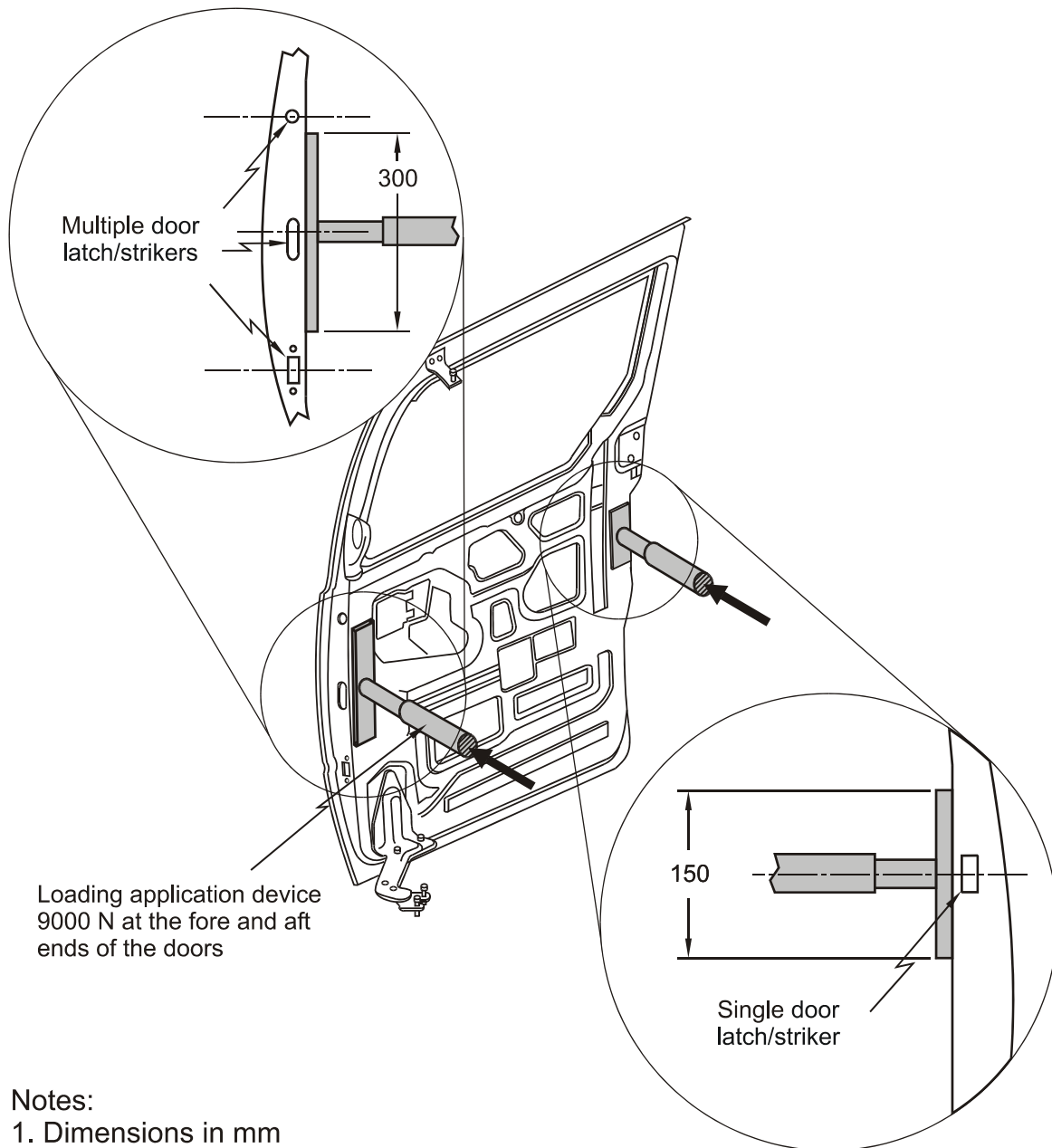
- Notes:
1. Dimensions in mm
  2. Not to scale

**Figure 7 — Static Test Fixtures for Back Doors**



Note: Vertical test applied in either one of the two directions

Figure 8 — Static Load Test Directions for Back Doors



Notes:

1. Dimensions in mm
2. Not to scale
3. Sliding door is shown separate from the vehicle.

**Figure 9 — Sliding Side Door Full-Vehicle Test Procedure**