

in motor vehicles in certain adjustment positions or under certain circumstances, an appropriate statement of the manufacturers restrictions regarding those positions or circumstances.

(3) As appropriate, the statements required by the following sections will be bulleted and placed after the statement required by 5.5.5(g)(1) in the following order: 5.5.5(g)(2), 5.5.5(f), S5.5.5(h) and S5.5.5(i).

(h) In the case of each built-in child restraint system that has belts designed to restrain children using them and which do not adjust automatically to fit the child: Snugly adjust the belts provided with this child restraint around your child.

(i) In the case of each built-in child restraint which can be used in a rear-facing position, the following statement: Place an infant in a rear-facing position in this child restraint.

\* \* \* \* \*

S5.6 Printed Instructions for Proper Use.

Any labels or written instructions provided in addition to those required by this section shall not obscure or confuse the meaning of the required information or be otherwise misleading to the consumer. Any labels or written instructions other than in the English language shall be an accurate translation of English labels or written instructions. Unless written in all capitals, the information required by S5.6.1 through S5.6.3 shall be stated in sentence capitalization.

\* \* \* \* \*

S5.6.1.10(a) For instructions for a booster seat that is recommended for use with either a vehicle's Type I or Type II seat belt assembly, one of the following statements, as appropriate, and the reasons for the statement:

(1) Warning! Use only the vehicle's lap and shoulder belt system when restraining the child in this booster seat; or,

(2) Warning! Use only the vehicle's lap belt system, or the lap belt part of a lap/shoulder belt system with the shoulder belt placed behind the child, when restraining the child in this seat.

(b)(1) Except as provided in S5.6.1.10(b)(2), the instructions for a booster seat that is recommended for use with both a vehicle's Type I and Type II seat belt assemblies shall include the following statement and the reasons therefor: Warning! Use only the vehicle's lap belt system, or the lap belt part of a lap/shoulder belt system with the shoulder belt placed behind the child, when restraining the child with the (insert description of the system element provided to restrain forward movement of the child's torso when used with a lap belt (e.g., shield)), and only the vehicle's lap and shoulder belt system when using this booster without the (insert above description).

(2) A booster seat which is recommended for use with both a vehicle's Type I and Type II seat belt assemblies is not subject to S5.6.1.10(b)(1) if, when the booster is used with the shield or similar component, the booster will cause the shoulder belt to be located in a position other than in front of the child when the booster is installed. However, the instructions for such a booster shall include a warning to use the booster with the vehicle's lap and shoulder belt system when using the booster without a shield.

\* \* \* \* \*

S5.6.3 Add-on and built-in child restraint systems.

In the case of each child restraint system that has belts designed to restrain children using them and which do not adjust automatically to fit the child, the printed instructions shall include the following statement: A snug strap should not allow any slack. It lies in a relatively straight line without sagging. It does not press on the child's flesh or push the child's body into an unnatural position.

\* \* \* \* \*

§571.214 Standard No. 214; Side impact protection.

S1. Scope and purpose.

(a) Scope. This standard specifies performance requirements for protection of occupants in side impact crashes.

(b) Purpose. The purpose of this standard is to reduce the risk of serious and fatal injury to occupants of passenger cars, multipurpose passenger vehicles, trucks and buses in side impact crashes by specifying vehicle crashworthiness requirements in terms of accelerations measured on anthropomorphic dummies in test crashes, by specifying strength requirements for side doors, and by other means.

S2. This standard applies to—

(a) Passenger cars;

(b) Effective September 1, 1993, sections S3(a), S3(e), S3.1 through S3.2.3, and S4 of the standard apply to multipurpose passenger vehicles, trucks, and buses with a GVWR of 10,000 pounds or less, except for walk-in vans; and

(c) Effective September 1, 1998, sections S3(f) and S5 of the standard apply to multipurpose passenger vehicles, trucks and buses with a GVWR of 6,000 pounds or less, except for walk-in vans, motor homes, tow trucks, dump

trucks, ambulances and other emergency rescue/medical vehicles (including vehicles with fire-fighting equipment), vehicles equipped with wheelchair lifts, and vehicles which have no doors or exclusively have doors that are designed to be easily attached or removed so the vehicle can be operated without doors.

**S2.1 Definitions.**

*Contoured* means, with respect to a door, that the lower portion of its front or rear edge is curved upward, typically to conform to a wheel well.

*Double side doors* means a pair of hinged doors with the lock and latch mechanisms located where the door lips overlap.

*Walk-in van* means a van in which a person can enter the occupant compartment in an upright position.

**S3. Requirements.** (a)(1) Except as provided in section S3(e), each passenger car shall be able to meet the requirements of either, at the manufacturer's option, S3.1 or S3.2, when any of its side doors that can be used for occupant egress is tested according to S4.

(2) Except as provided in section S3(e), each multipurpose passenger vehicle, truck and bus manufactured on or after September 1, 1994 shall be able to meet the requirements of either, at the manufacturer's option, S3.1 or S3.2, when any of its side doors that can be used for occupant egress is tested according to S4.

(b) When tested under the conditions of S6, each passenger car manufactured on or after September 1, 1996 shall meet the requirements of S5.1, S5.2, and S5.3 in a 33.5 miles per hour impact in which the car is struck on either side by a moving deformable barrier. Part 572, subpart F test dummies are placed in the front and rear outboard seating positions on the struck side of the car. However, the rear seat requirements do not apply to passenger cars with a wheelbase greater than 130 inches, or to passenger cars which have rear seating areas that are so small that the part 572, subpart F dummies cannot be accommodated according to the positioning procedure specified in S7.

(c) Except as provided in paragraph (d) of this section, from September 1, 1993 to August 31, 1996, a specified percentage of each manufacturer's yearly

passenger car production, as set forth in S8, shall, when tested under the conditions of S6, meet the requirements of S5.1, S5.2, and S5.3 in a 33.5 miles per hour impact in which the car is struck on either side by a moving deformable barrier. Part 572, subpart F test dummies are placed in the front and rear outboard seating positions on the struck side of the car. However, the rear seat requirements do not apply to passenger cars with a wheelbase greater than 130 inches, or to passenger cars which have rear seating areas that are so small that the part 572, subpart F dummies cannot be accommodated according to the positioning procedure specified in S7.

(d) A manufacturer may, at its option, comply with the requirements of this paragraph instead of paragraph (c) of this section. When tested under the conditions of S6, each passenger car manufactured from September 1, 1994 to August 31, 1996 shall meet the requirements of S5.1, S5.2, and S5.3 in a 33.5 miles per hour impact in which the car is struck on either side by a moving deformable barrier. Part 572, subpart F test dummies are placed in the front and rear outboard seating positions on the struck side of the car. However, the rear seat requirements do not apply to passenger cars with a wheelbase greater than 130 inches, or to passenger cars which have rear seating areas that are so small that the part 572, subpart F dummies cannot be accommodated according to the positioning procedure specified in S7.

(e) A vehicle need not meet the requirements of sections S3.1 or S3.2 for—

(1) Any side door located so that no point on a ten-inch horizontal longitudinal line passing through and bisected by the H-point of a manikin placed in any seat, with the seat adjusted to any position and the seat back adjusted as specified in Section S6.4, falls within the transverse, horizontal projection of the door's opening.

(2) Any side door located so that no point on a ten-inch horizontal longitudinal line passing through and bisected by the H-point of a manikin placed in any seat recommended by the manufacturer for installation in a location for

which seat anchorage hardware is provided, with the seat adjusted to any position and the seat back adjusted as specified in section S6.4, falls within the transverse, horizontal projection of the door's opening,

(3) Any side door located so that a portion of a seat, with the seat adjusted to any position and the seat back adjusted as specified in section S6.4, falls within the transverse, horizontal projection of the door's opening, but a longitudinal vertical plane tangent to the outboard side of the seat cushion is more than 10 inches from the innermost point on the inside surface of the door at a height between the H-point and shoulder reference point (as shown in figure 1 of the Federal Motor Vehicle Safety Standard No. 210) and longitudinally between the front edge of the cushion with the seat adjusted to its forwardmost position and the rear edge of the cushion with the seat adjusted to its rearmost position.

(4) Any side door that is designed to be easily attached to or removed (e.g., using simple hand tools such as pliers and/or a screw driver) from a motor vehicle manufactured for operation without doors.

(f) When tested according to the conditions of S6, each multipurpose passenger vehicle, truck and bus manufactured on or after September 1, 1998, shall meet the requirements of S5.1, S5.2, and S5.3 in a 33.5 miles per hour impact in which the vehicle is struck on either side by a moving deformable barrier. A part 572, subpart F test dummy is placed in the front outboard seating position on the struck side of the vehicle, and if the vehicle is equipped with rear seats, then another part 572, subpart F test dummy is placed on the outboard seating position of the second seat on the struck side of the vehicle. However, the second seat requirements do not apply to side-facing seats or to vehicles that have second seating areas that are so small that the part 572, subpart F dummy can not be accommodated according to the positioning procedure specified in S7.

S3.1 With any seats that may affect load upon or deflection of the side of the vehicle removed from the vehicle,

each vehicle must be able to meet the requirements of S3.1.1 through S3.1.3.

S3.1.1 *Initial crush resistance.* The initial crush resistance shall not be less than 2,250 pounds.

S3.1.2 *Intermediate crush resistance.* The intermediate crush resistance shall not be less than 3,500 pounds.

S3.1.3 *Peak crush resistance.* The peak crush resistance shall not be less than two times the curb weight of the vehicle or 7,000 pounds, whichever is less.

S3.2 With seats installed in the vehicle, and located in any horizontal or vertical position to which they can be adjusted and at any seat back angle to which they can be adjusted, each vehicle must be able to meet the requirements of S3.2.1 through S3.2.3.

S3.2.1 *Initial crush resistance.* The initial crush resistance shall not be less than 2,250 pounds.

S3.2.2 *Intermediate crush resistance.* The intermediate crush resistance shall not be less than 4,375 pounds.

S3.2.3 *Peak crush resistance.* The peak crush resistance shall not be less than three and one half times the curb weight of the vehicle or 12,000 pounds, whichever is less.

S4. *Test procedures.* The following procedures apply to determining compliance with paragraph S3:

(a) Place side windows in their uppermost position and all doors in locked position. Place the sill of the side of the vehicle opposite to the side being tested against a rigid unyielding vertical surface. Fix the vehicle rigidly in position by means of tiedown attachments located at or forward of the front wheel centerline and at or rearward of the rear wheel centerline.

(b) Prepare a loading device consisting of a rigid steel cylinder or semicylinder 305 mm (12 inches) in diameter with an edge radius of 13 mm ( $\frac{1}{2}$  inch). The length of the loading device shall be such that—

(1) For doors with windows, the top surface of the loading device is at least 13 mm ( $\frac{1}{2}$  inch) above the bottom edge of the door window opening but not of a length that will cause contact with any structure above the bottom edge of the door window opening during the test.

(2) For doors without windows, the top surface of the loading device is at the same height above the ground as when the loading device is positioned in accordance with paragraph (b)(1) of this section for purposes of testing a front door with windows on the same vehicle.

(c) Locate the loading device as shown in Figure 1 (side view) of this section so that—

(1) Its longitudinal axis is vertical.

(2) Except as provided in paragraphs (c)(2) (i) and (ii) of this section, its longitudinal axis is laterally opposite the midpoint of a horizontal line drawn across the outer surface of the door 127 mm (5 inches) above the lowest point of the door, exclusive of any decorative or protective molding that is not permanently affixed to the door panel.

(i) For contoured doors on trucks, buses, and multipurpose passenger vehicles with a GVWR of 4,545 kg (10,000 pounds) or less, if the length of the horizontal line specified in (c)(2) is not equal to or greater than 559 mm (22 inches), the line is moved vertically up the side of the door to the point at which the line is 559 mm (22 inches) long. The longitudinal axis of the loading device is then located laterally opposite the midpoint of that line.

(ii) For double side doors on trucks, buses, and multipurpose passenger vehicles with a GVWR of 4,545 kg (10,000 pounds) or less, its longitudinal axis is laterally opposite the midpoint of a horizontal line drawn across the outer surface of the double door span, 127 mm (5 inches) above the lowest point on the doors, exclusive of any decorative or protective molding that is not permanently affixed to the door panel.

(3) Except as provided in paragraphs (c)(3) (i) and (ii) of this section, its bottom surface is in the same horizontal plane as the horizontal line drawn across the outer surface of the door 127 mm (5 inches) above the lowest point of the door, exclusive of any decorative or protective molding that is not permanently affixed to the door panel.

(i) For contoured doors on trucks, buses, and multipurpose passenger vehicles with a GVWR of 4,545 kg (10,000 pounds) or less, its bottom surface is in the lowest horizontal plane such that every point on the lateral projection of

the bottom surface of the device on the door is at least 127 mm (5 inches), horizontally and vertically, from any edge of the door panel, exclusive of any decorative or protective molding that is not permanently affixed to the door panel.

(ii) For double side doors, its bottom surface is in the same horizontal plane as a horizontal line drawn across the outer surface of the double door span, 127 mm (5 inches) above the lowest point of the doors, exclusive of any decorative or protective molding that is not permanently affixed to the door panel.

(d) Using the loading device, apply a load to the outer surface of the door in an inboard direction normal to a vertical plane along the vehicle's longitudinal centerline. Apply the load continuously such that the loading device travel rate does not exceed one-half inch per second until the loading device travels 18 inches. Guide the loading device to prevent it from being rotated or displaced from its direction of travel. The test must be completed within 120 seconds.

(e) Record applied load versus displacement of the loading device, either continuously or in increments of not more than 1 inch or 200 pounds for the entire crush distance of 18 inches.

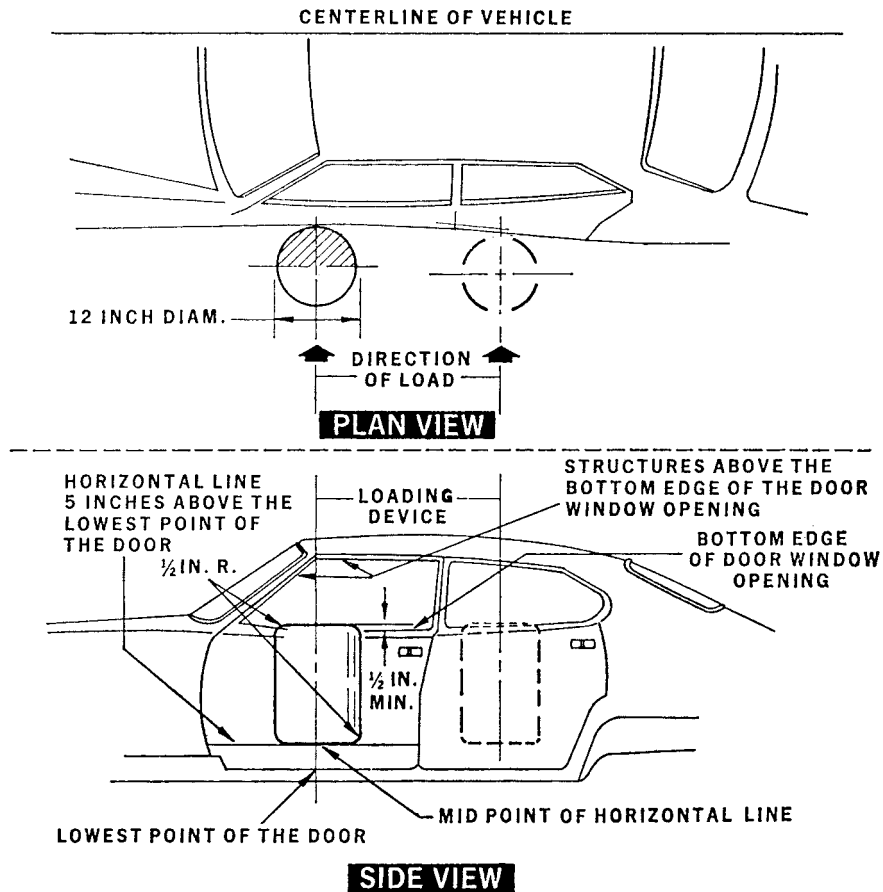
(f) Determine the initial crush resistance, intermediate crush resistance, and peak crush resistance as follows:

(1) From the results recorded in paragraph (e) of this section, plot a curve of load versus displacement and obtain the integral of the applied load with respect to the crush distances specified in paragraphs (f) (2) and (3) of this section. These quantities, expressed in inch-pounds and divided by the specified crush distances, represent the average forces in pounds required to deflect the door those distances.

(2) The initial crush resistance is the average force required to deform the door over the initial 6 inches of crush.

(3) The intermediate crush resistance is the average force required to deform the door over the initial 12 inches of crush.

(4) The peak crush resistance is the largest force recorded over the entire 18-inch crush distance.



LOADING DEVICE LOCATION AND APPLICATION TO THE DOOR

FIGURE 1

S5. *Dynamic performance requirements.*

S5.1 *Thorax.* The Thoracic Trauma Index (TTI(d)) shall not exceed:

(a) 85 g for a passenger car with four side doors, and for any multipurpose passenger vehicle, truck, or bus; and,

(b) 90 g for a passenger car with two side doors, when calculated in accordance with the following formula:

$$TTI(d) = 1/2 (G_R + G_{LS})$$

The term "G<sub>R</sub>" is the greater of the peak accelerations of either the upper or lower rib, expressed in g's and the

term "G<sub>LS</sub>" is the lower spine (T12) peak acceleration, expressed in g's. The peak acceleration values are obtained in accordance with the procedure specified in S6.13.5.

S5.2 *Pelvis.* The peak lateral acceleration of the pelvis, as measured in accordance with S6.13.5, shall not exceed 130 g's.

S5.3 *Door opening.*

S5.3.1 Any side door, which is struck by the moving deformable barrier, shall not separate totally from the car.

## §571.214

S5.3.2 Any door (including a rear hatchback or tailgate), which is not struck by the moving deformable barrier, shall meet the following requirements:

S5.3.2.1 The door shall not disengage from the latched position;

S5.3.2.2 The latch shall not separate from the striker, and the hinge components shall not separate from each other or from their attachment to the vehicle.

S5.3.2.3 Neither the latch nor the hinge systems of the door shall pull out of their anchorages.

### S6. Test conditions.

S6.1 *Test weight.* Each vehicle is loaded to its unloaded vehicle weight, plus 300 pounds or its rated cargo and luggage capacity (whichever is less), secured in the luggage or load-carrying area, plus the weight of the necessary anthropomorphic test dummies. Any added test equipment is located away from impact areas in secure places in the vehicle. The vehicle's fuel system is filled in accordance with the following procedure. With the test vehicle on a level surface, pump the fuel from the vehicle's fuel tank and then operate the engine until it stops. Then, add Stoddard solvent to the test vehicle's fuel tank in an amount which is equal to not less than 92 percent and not more than 94 percent of the fuel tank's usable capacity stated by the vehicle's manufacturer. In addition, add the amount of Stoddard solvent needed to fill the entire fuel system from the fuel tank through the engine's induction system.

S6.2 *Vehicle test attitude.* Determine the distance between a level surface and a standard reference point on the test vehicle's body, directly above each wheel opening, when the vehicle is in its "as delivered" condition. The "as delivered" condition is the vehicle as received at the test site, filled to 100 percent of all fluid capacities and with all tires inflated to the manufacturer's specifications listed on the vehicle's tire placard. Determine the distance between the same level surface and the same standard reference points in the vehicle's "fully loaded condition." The "fully loaded condition" is the test vehicle loaded in accordance with S6.1. The load placed in the cargo area is

## 49 CFR Ch. V (10-1-02 Edition)

centered over the longitudinal centerline of the vehicle. The pretest vehicle attitude is equal to either the as delivered or fully loaded attitude or between the as delivered attitude and the fully loaded attitude.

S6.3 *Adjustable seats.* Adjustable seats are placed in the adjustment position midway between the forward most and rearmost positions, and if separately adjustable in a vertical direction, are at the lowest position. If an adjustment position does not exist midway between the forwardmost and rearmost positions, the closest adjustment position to the rear of the midpoint is used.

S6.4 *Adjustable seat back placement.* Place adjustable seat backs in the manufacturer's nominal design riding position in the manner specified by the manufacturer. If the position is not specified, set the seat back at the first detent rearward of 25° from the vertical. Place each adjustable head restraint in its highest adjustment position. Position adjustable lumbar supports so that they are set in their released, i.e., full back position.

S6.5 *Adjustable steering wheels.* Adjustable steering controls are adjusted so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions.

S6.6 *Windows.* Movable vehicle windows and vents are placed in the fully closed position on the struck side of the vehicle.

S6.7 *Convertible tops.* Convertibles and open-body type vehicles have the top, if any, in place in the closed passenger compartment configuration.

S6.8 *Doors.* Doors, including any rear hatchback or tailgate, are fully closed and latched but not locked.

S6.9 *Transmission and brake engagement.* For a vehicle equipped with a manual transmission, the transmission is placed in second gear. For a vehicle equipped with an automatic transmission, the transmission is placed in neutral. For all vehicles, the parking brake is engaged.

S6.10 *Moving deformable barrier.* The moving deformable barrier conforms to the dimensions shown in Figure 2 and specified in part 587.

S6.11 *Impact reference line.* Place a vertical reference line at the location described below on the side of the vehicle that will be struck by the moving deformable barrier:

S6.11.1 *Passenger cars.*

(a) For vehicles with a wheelbase of 114 inches or less, 37 inches forward of the center of the vehicle's wheelbase.

(b) For vehicles with a wheelbase greater than 114 inches, 20 inches rearward of the centerline of the vehicle's front axle.

S6.11.2 *Multipurpose passenger vehicles, trucks and buses.*

(a) For vehicles with a wheelbase of 98 inches or less, 12 inches rearward of the centerline of the vehicle's front axle, except as otherwise specified in paragraph (d) of this section.

(b) For vehicles with a wheelbase of greater than 98 inches but not greater than 114 inches, 37 inches forward of the center of the vehicle's wheelbase, except as otherwise specified in paragraph (d) of this section.

(c) For vehicles with a wheelbase greater than 114 inches, 20 inches rearward of the centerline of the vehicle's front axle, except as otherwise specified in paragraph (d) of this section.

(d) At the manufacturer's option, for different wheelbase versions of the same model vehicle, the impact reference line may be located by the following:

(1) Select the shortest wheelbase vehicle of the different wheelbase versions of the same model and locate on it the impact reference line at the location described in (a), (b) or (c) of this section, as appropriate;

(2) Measure the distance between the seating reference point (SgRP) and the impact reference line;

(3) Maintain the same distance between the SgRP and the impact reference line for the version being tested as that between the SgRP and the impact reference line for the shortest wheelbase version of the model.

(e) For the compliance test, the impact reference line will be located using the procedure used by the manufacturer as the basis for its certification of compliance with the requirements of this standard. If the manufacturer did not use any of the procedures in this section, or does not specify a

procedure when asked by the agency, the agency may locate the impact reference line using either procedure.

S6.12 *Impact configuration.* The test vehicle (vehicle A in Figure 3) is stationary. The line of forward motion of the moving deformable barrier (vehicle B in Figure 3) forms an angle of 63 degrees with the centerline of the test vehicle. The longitudinal centerline of the moving deformable barrier is perpendicular to the longitudinal centerline of the test vehicle when the barrier strikes the test vehicle. In a test in which the test vehicle is to be struck on its left (right) side: All wheels of the moving deformable barrier are positioned at an angle of  $27 \pm 1$  degrees to the right (left) of the centerline of the moving deformable barrier; and the left (right) forward edge of the moving deformable barrier is aligned so that a longitudinal plane tangent to that side passes through the impact reference line within a tolerance of  $\pm 2$  inches when the barrier strikes the test vehicle.

S6.13 *Anthropomorphic test dummies.*

S6.13.1 The anthropomorphic test dummies used for evaluation of a vehicle's side impact protection conform to the requirements of subpart F of part 572 of this chapter. In a test in which the test vehicle is to be struck on its left side, each dummy is to be configured and instrumented to be struck on its left side, in accordance with subpart F of part 572. In a test in which the test vehicle is to be struck on its right side, each dummy is to be configured and instrumented to be struck on its right side, in accordance with subpart F of part 572.

S6.13.2 Each part 572, subpart F test dummy specified is clothed in formfitting cotton stretch garments with short sleeves and midcalf length pants. Each foot of the test dummy is equipped with a size 11EEE shoe, which meets the configuration size, sole, and heel thickness specifications of MIL-S-13192 (1976) and weighs  $1.25 \pm 0.2$  pounds.

S6.13.3 Limb joints are set at between 1 and 2 g's. Leg joints are adjusted with the torso in the supine position.

S6.13.4 The stabilized temperature of the test dummy at the time of the

**§571.214**

side impact test shall be at any temperature between 66 degrees F. and 78 degrees F.

S6.13.5 The acceleration data from the accelerometers mounted on the ribs, spine and pelvis of the test dummy are processed with the FIR100 software specified in 49 CFR 572.44(d). The data are processed in the following manner:

S6.13.5.1 Filter the data with a 300 Hz, SAE Class 180 filter;

S6.13.5.2 Subsample the data to a 1600 Hz sampling rate;

**49 CFR Ch. V (10-1-02 Edition)**

S6.13.5.3 Remove the bias from the subsampled data, and

S6.13.5.4 Filter the data with the FIR100 software specified in 49 CFR 572.44(d), which has the following characteristics—

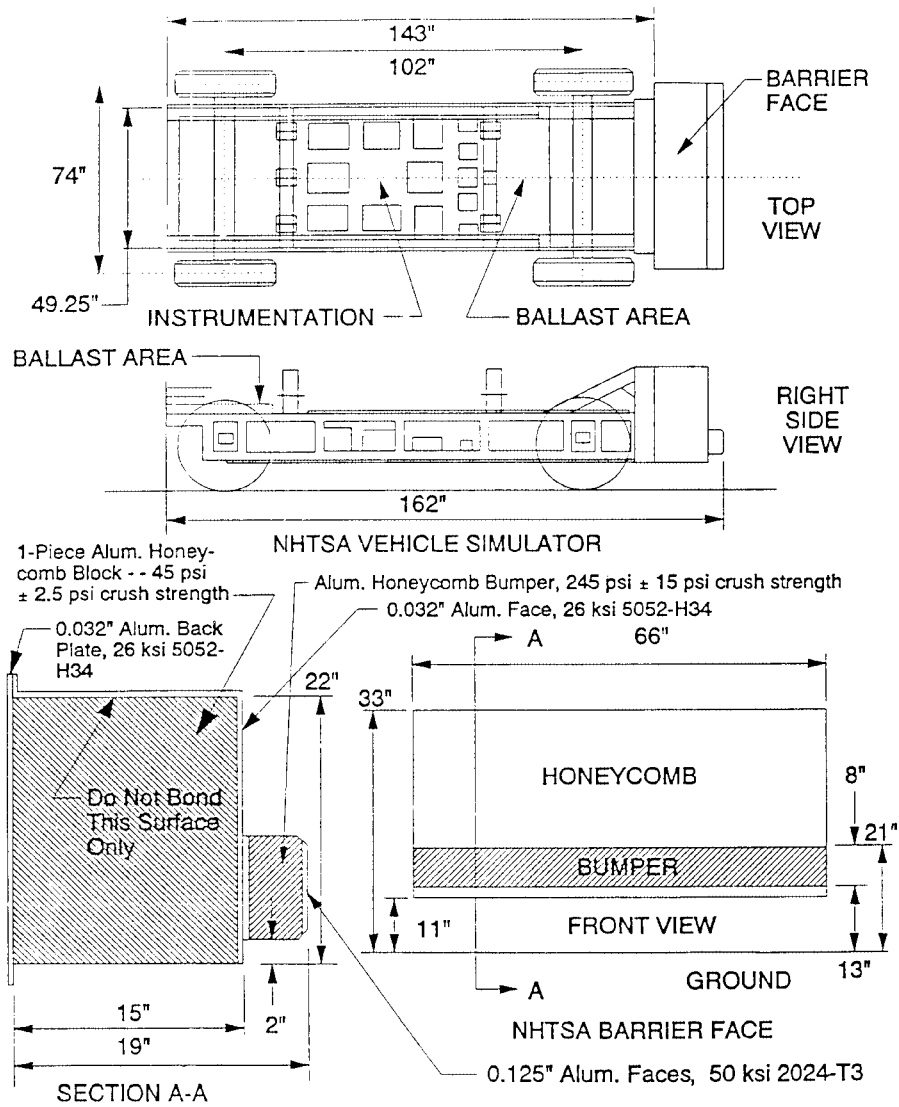
S6.13.5.4.1 Passband frequency 100 Hz.

S6.13.5.4.2 Stopband frequency 189 Hz.

S6.13.5.4.3 Stopband gain -50 db.

S6.13.5.4.4 Passband ripple 0.0225 db.





NHTSA SIDE IMPACTOR - MOVING DEFORMABLE BARRIER  
FIGURE 2

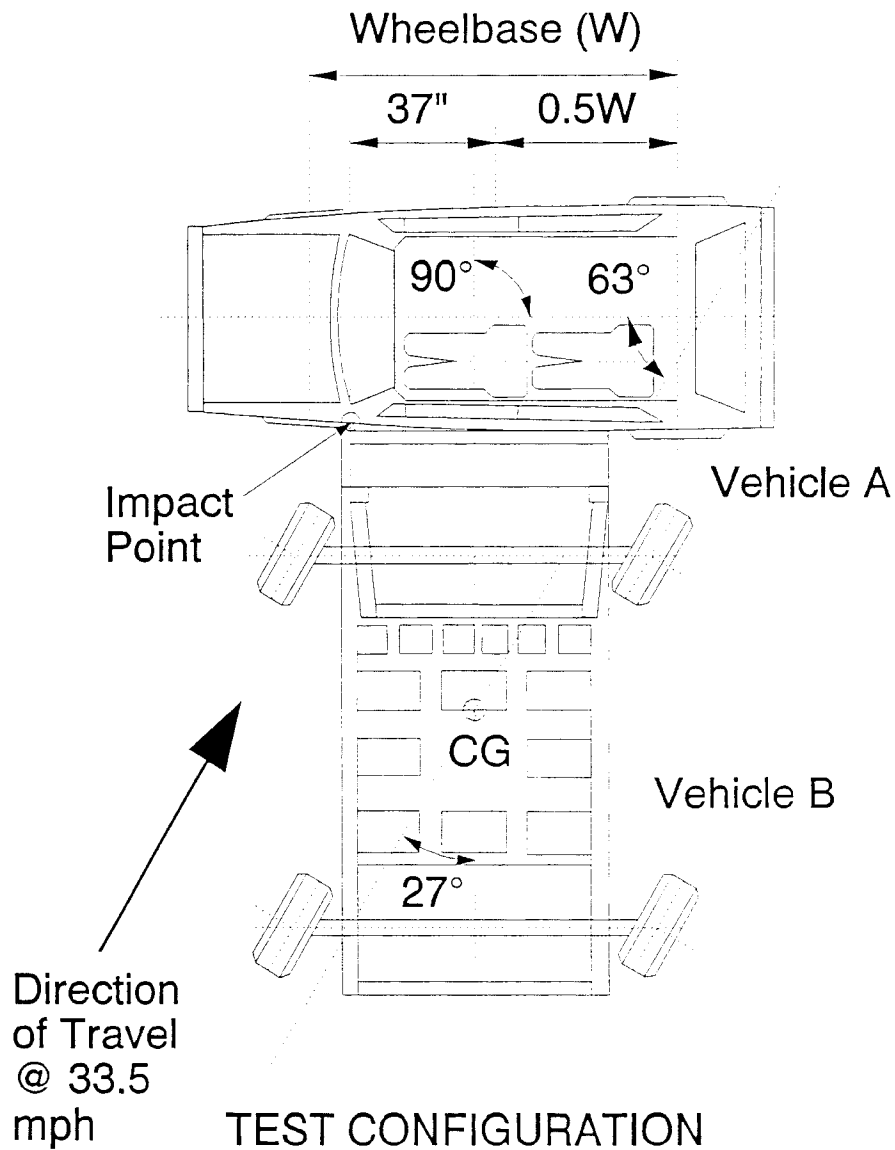


Figure 3

S7. Positioning procedure for the part 572 subpart F test dummy. Position a correctly configured test dummy, conforming to subpart F of part 572 of this

chapter, in the front outboard seating position on the side of the test vehicle to be struck by the moving deformable barrier and, if the vehicle has a second

seat, position another conforming test dummy in the second seat outboard position on the same side of the vehicle, as specified in S7.1 through S7.4. Each test dummy is restrained using all available belt systems in all seating positions where such belt restraints are provided. In addition, any folding armrest is retracted.

S7.1 *Torso.* For a test dummy in any seating position, hold the dummy's head in place and push laterally on the non-impacted side of the upper torso in a single stroke with a force of 15–20 lb. towards the impacted side.

S7.1.1 *For a test dummy in the driver position.*

(a) *For a bench seat.* The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and passes through the center of the steering wheel.

(b) *For a bucket seat.* The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and coincides with the longitudinal centerline of the bucket seat.

S7.1.2 *For a test dummy in the front outboard passenger position.*

(a) *For a bench seat.* The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and the same distance from the vehicle's longitudinal centerline as would be the midsagittal plane of a test dummy positioned in the driver position under S7.1.1.

(b) *For a bucket seat.* The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and coincides with the longitudinal centerline of the bucket seat.

S7.1.3 *For a test dummy in either of the rear outboard passenger positions.*

(a) *For a bench seat.* The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and, if possible, the same distance from the vehicle's longitudinal centerline as

the midsagittal plane of a test dummy positioned in the driver position under S7.1.1. If it is not possible to position the test dummy so that its midsagittal plane is parallel to the vehicle longitudinal centerline and is at this distance from the vehicle's longitudinal centerline, the test dummy is positioned so that some portion of the test dummy just touches, at or above the seat level, the side surface of the vehicle, such as the upper quarter panel, an armrest, or any interior trim (i.e., either the broad trim panel surface or a smaller, localized trim feature).

(b) *For a bucket or contoured seat.* The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and coincides with the longitudinal centerline of the bucket or contoured seat.

S7.2 *Pelvis.*

S7.2.1 *H-point.* The H-points of each test dummy coincide within ½ inch in the vertical dimension and ½ inch in the horizontal dimension of a point ¼ inch below the position of the H-point determined by using the equipment for the 50th percentile and procedures specified in SAE J826 (1980) (incorporated by reference; see §571.5), except that Table 1 of SAE J826 is not applicable. The length of the lower leg and thigh segments of the H-point machine are adjusted to 16.3 and 15.8 inches, respectively.

S7.2.2 *Pelvic angle.* As determined using the pelvic angle gauge (GM drawing 78051–532 incorporated by reference in part 572, subpart E of this chapter) which is inserted into the H-point gauging hole of the dummy, the angle of the plane of the surface of the lumbar-pelvic adaptor on which the lumbar spine attaches is 23 to 25 degrees from the horizontal, sloping upward toward the front of the vehicle.

S7.3 *Legs.*

S7.3.1 *For a test dummy in the driver position.* The upper legs of each test dummy rest against the seat cushion to the extent permitted by placement of the feet. The left knee of the dummy is positioned such that the distance from the outer surface of the knee pivot bolt to the dummy's midsagittal

## §571.215

plane is six inches. To the extent practicable, the left leg of the test dummy is in a vertical longitudinal plane.

S7.3.2 *For a test dummy in the outboard passenger positions.* The upper legs of each test dummy rest against the seat cushion to the extent permitted by placement of the feet. The initial distance between the outboard knee clevis flange surfaces is 11.5 inches. To the extent practicable, both legs of the test dummies in outboard passenger positions are in vertical longitudinal planes. Final adjustment to accommodate placement of feet in accordance with S7.4 for various passenger compartment configurations is permitted.

### S7.4 Feet.

S7.4.1 *For a test dummy in the driver position.* The right foot of the test dummy rests on the undepressed accelerator with the heel resting as far forward as possible on the floorpan. The left foot is set perpendicular to the lower leg with the heel resting on the floorpan in the same lateral line as the right heel.

S7.4.2 *For a test dummy in the front outboard passenger position.* The feet of the test dummy are placed on the vehicle's toeboard with the heels resting on the floorpan as close as possible to the intersection of the toeboard and floorpan. If the feet cannot be placed flat on the toeboard, they are set perpendicular to the lower legs and placed as far forward as possible so that the heels rest on the floorpan.

S7.4.3 *For a test dummy in either of the rear outboard passenger positions.* The feet of the test dummy are placed flat on the floorpan and beneath the front seat as far as possible without front seat interference. If necessary, the distance between the knees can be changed in order to place the feet beneath the seat.

S8. *Phase-in of dynamic test and performance requirements.*

S8.1–S8.2 [Reserved]

S8.3 *Passenger cars manufactured on or after September 1, 1995 and before September 1, 1996.*

S8.3.1 The number of passenger cars complying with the requirements of S3(c) shall be not less than 40 percent of:

(a) The average annual production of passenger cars manufactured on or

## 49 CFR Ch. V (10–1–02 Edition)

after September 1, 1992, and before September 1, 1995, by each manufacturer, or

(b) The manufacturer's annual production of passenger cars during the period specified in S8.3.

S8.4 *Passenger cars produced by more than one manufacturer.*

S8.4.1 For the purposes of calculating average annual production of passenger cars for each manufacturer and the number of passenger cars manufactured by each manufacturer under S8.1, S8.2, and S8.3, a passenger car produced by more than one manufacturer shall be attributed to a single manufacturer as follows, subject to S8.4.2:

(a) A passenger car which is imported shall be attributed to the importer.

(b) A passenger car manufactured in the United States by more than one manufacturer, one of which also markets the vehicle, shall be attributed to the manufacturer which markets the vehicle.

S8.4.2 A passenger car produced by more than one manufacturer shall be attributed to any one of the vehicle's manufacturers specified by an express written contract, reported to the National Highway Traffic Safety Administration under 49 CFR part 586, between the manufacturer so specified and the manufacturer to which the vehicle would otherwise be attributed under S8.4.1.

[36 FR 22902, Dec. 2, 1971, as amended at 45 FR 17018, Mar. 17, 1980; 55 FR 45752, Oct. 30, 1990; 56 FR 27437, June 14, 1991; 56 FR 47011, Sept. 17, 1991; 57 FR 21615, May 21, 1992; 57 FR 30921 and 30922, July 13, 1992; 58 FR 14169, Mar. 16, 1993; 60 FR 38761, July 28, 1995; 60 FR 57839, Nov. 22, 1995; 63 FR 16140, Apr. 2, 1998]

## §571.215 [Reserved]

## §571.216 Standard No. 216; Roof crush resistance.

S1. *Scope.* This standard establishes strength requirements for the passenger compartment roof.

S2. *Purpose.* The purpose of this standard is to reduce deaths and injuries due to the crushing of the roof into the occupant compartment in rollover crashes.

S3. *Application.* This standard applies to passenger cars, and to multipurpose passenger vehicles, trucks and buses