

National Highway Safety Bureau

[49 CFR Part 571]

[Docket No. 2-6; Notice 4]

ROOF INTRUSION PROTECTION FOR PASSENGER CARS

Proposed Motor Vehicle Safety Standard

The purpose of this notice is to propose a motor vehicle safety standard that would establish minimum strength requirements for a passenger car roof to reduce the likelihood of roof collapse in a rollover accident. An advance notice of rule making on the general subject of intrusion from exterior impact, including roof intrusion, was published on October 13, 1967 (32 F.R. 14278; Docket No. 2-6).

The strength of a vehicle's roof has an evident bearing on the integrity of the passenger compartment in a rollover-type accident and consequently on the safety of the occupants. When applied to 1969 accident data, the analysis developed in a recent study indicates that approximately 1,400 motor vehicle occupants were killed in that year by impact with roof structure in rollover accidents. Roof intrusion would have been sufficient in many of the cases for the roof to have struck the head of a properly restrained occupant. The benefits of occupant restraint are negated if the passenger compartment collapses in this fashion, and it is therefore important that minimum roof strength requirements be established.

The proposed standard would establish requirements for the forward portion of the roof. This is the area of the roof most likely to sustain severe damage, particularly for front-engine passenger cars. In addition, the front seats are more frequently occupied than the rear seats, and tend to be more dangerous in a crash.

The resistance of the roof to intrusion is determined by a static test, in which a force of $1\frac{1}{2}$ times the empty weight of the vehicle or 5,000 pounds, whichever is less, is gradually applied to the roof in the vicinity of the "A" pillar. The force is applied by a flat test device at a 25° roll angle and 10° pitch angle to simulate the direction of forces that can be encountered in a rollover. During the test, the roof may show no more than 5 inches of intrusion, as measured by the movement of the test device.

Proposed effective date: January 1, 1973.

In consideration of the above, it is proposed that a standard on roof intrusion protection be issued as set forth below. Comments are invited on the proposal, particularly on the lead time required for compliance. Comments should identify the docket number and be submitted to: Docket Section, National Highway Safety Bureau, Room 4223, 400 Seventh Street SW., Washington, DC 20591. It is requested, but not required, that 10 copies be submitted.

All comments received before the close of business on April 5, 1971, will be con-

sidered, and will be available for examination in the Rules Docket at the above address both before and after the closing date. To the extent possible, comments filed after the above date will also be considered by the Bureau. However, the rule making action may proceed at any time after that date, and comments received after the closing date and too late for consideration in regard to the action will be treated as suggestions for future rule making. The Bureau will continue to file relevant material, as it becomes available, in the docket after the closing date, and it is recommended that interested persons continue to examine the docket for new materials.

This notice of proposed rule making is issued under the authority of sections 103 and 119 of the National Traffic and Motor Vehicle Safety Act of 1966, 15 U.S.C. 1392, 1407, and the delegations of authority at 49 CFR 1.51 (35 F.R. 4955) and 49 CFR 501.8 (35 F.R. 11126).

Issued on December 28, 1970.

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§ 571.21 Federal motor vehicle safety standards.

ROOF INTRUSION PROTECTION—PASSENGER CARS

571.21-1 Scope. This standard establishes strength requirements, under compressive forces such as those likely to be experienced in a rollover accident, for the forward portion of the passenger compartment roof.

571.21-2 Purpose. The purpose of this standard is to reduce deaths and injuries due to the intrusion of the roof into the passenger compartment in rollover accidents.

571.21-3 Application. This standard applies to passenger cars.

571.21-4 Requirements. A test device as described in S5. shall not move more than 5 inches, measured in accordance with

S6.4, when it is used to apply a force of $1\frac{1}{2}$ times the empty weight of the vehicle or 5,000 pounds, whichever is less, to each side of a vehicle's roof in accordance with the procedures of S6.

S5. Test device. The test device is a rigid, unyielding block with its lower surface formed as a flat square 12 inches on a side, and padded to a uniform depth of 2 inches. The padding is of such a stiffness that when the center of the padded surface is statically depressed 1 inch by a rigid disc 4 inches in diameter, the resistance offered by the padding is between 675 and 725 pounds.

S6. Test procedures. Each vehicle shall meet the requirements of S4. when tested in accordance with the following procedure.

S6.1 Place the sills or the chassis frame of the vehicle on a rigid horizontal surface, fix the vehicle rigidly in position, and close and lock all doors.

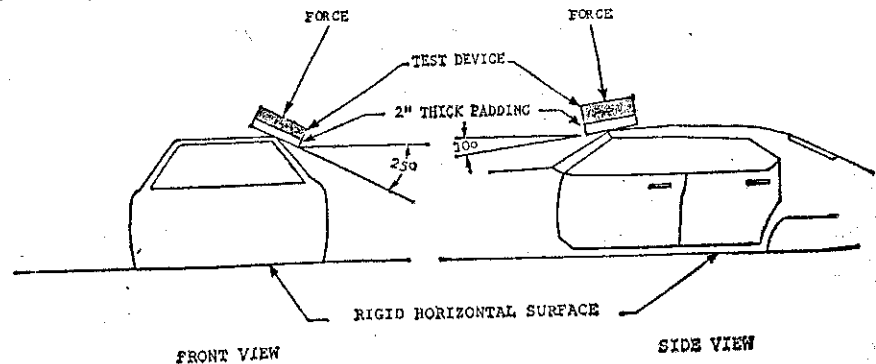
S6.2 Orient the test device as shown in Figure 1, so that its lower surface—

- (a) Is at a forward (side view) angle of 10° below the horizontal;
- (b) Is at a lateral (front view) outboard angle of 25° below the horizontal;
- (c) Has two edges parallel to the vertical plane through the vehicle's longitudinal centerline; and
- (d) At its center, is tangent to the surface of the vehicle.

S6.3 Apply force in a downward direction perpendicular to the rigid lower surface of the test device at a rate of not more than 200 pounds per second until reaching a force of $1\frac{1}{2}$ times the empty weight of the tested vehicle or 5,000 pounds, whichever is less. Guide the test device so that throughout the test it moves in a straight line with its rigid lower surface oriented as shown in Figure 1.

S6.4 Measure the distance that the test device moves, i.e., the distance between the location of the rigid portion of the test device as the maximum force level is reached and its original location.

S6.5 Repeat the test on the other front corner of the roof of the vehicle.



TEST DEVICE LOCATION AND APPLICATION TO THE ROOF

FIGURE 1

[F.R. Doc. 71-7; Filed, Jan. 5, 1971; 8:45 a.m.]