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TECHNICAL STANDARDS DOCUMENT No. 219, Revision 0R

Windshield Zone Intrusion

The text of this document is based on
Federal Motor Vehicle Safety Standard No. 219,
Windshield Zone Intrusion, as published in the
United States Code of Federal Regulations,
Title 49, Part 571, revised as of October 1, 2012.

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(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*](#) (MVSR) 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.

TSDs are revised from time to time in order to incorporate amendments made to the reference document, at which time a Notice of Revision is published in the *Canada Gazette*, Part I. All TSDs are assigned a revision number, with “Revision 0” designating the original version.

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or sections that do not apply under the Act or Regulations, the conversion of imperial to metric units, the deletion of superseded dates, and minor changes of an editorial nature.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 NOT REPRODUCED]”. 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 United States Department of Transportation are replaced by those of the Department of Transport.

Effective Date and Mandatory Compliance Date

The effective date of a TSD is the date of publication of its incorporating regulation or of the notice of revision in the *Canada Gazette*, and the date as of which voluntary compliance is permitted. The mandatory compliance date is the date upon which compliance with the requirements of the TSD is obligatory. If the effective date and mandatory compliance date are different, manufacturers may follow the requirements that were in force before the effective date, or those of the TSD, until the mandatory compliance date.

In the case of an initial TSD, or when a TSD is revised and incorporated by reference by an amendment to the Regulations, the mandatory compliance date is as specified in the Regulations, and it may be the same as the effective date. When a TSD is revised with no corresponding changes to the incorporating Regulations, the mandatory compliance date is six months after the effective date.

Official Version of Technical Standards Documents

The PDF version is a replica of the TSD as published by the Department and is to be used for the purposes of legal interpretation and application.

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S1. Scope

This Technical Standards Document (TSD) standard specifies limits for the displacement into the windshield area of motor vehicle components during a crash.

S2. Purpose

The purpose of this TSD ~~standard~~ is to reduce crash injuries and fatalities that result from occupants contacting vehicle components displaced near or through the windshield.

S3. Application

[CONTENT NOT REPRODUCED]

S4. Definition

Daylight Opening (DLO) means the maximum unobstructed opening through the glazing surface, including reveal or garnish moldings adjoining the surface, as measured parallel to the outer surface of the glazing material (Ouverture de jour).

S5. Requirement

When the vehicle travelling longitudinally forward at any speed up to and including 48 km/h impacts a fixed collision barrier that is perpendicular to the line of travel of the vehicle, under the conditions of S7, no part of the vehicle outside the occupant compartment, except windshield molding and other components designed to be normally in contact with the windshield, shall penetrate the protected zone template, affixed according to S6, to a depth of more than 6 mm, and no such part of a vehicle shall penetrate the inner surface of that portion of the windshield, within the DLO, below the protected zone defined in S6.

S6. Protected zone template

S6.1 Untitled

The lower edge of the protected zone is determined by the following procedure (See Figure 1).

- (a) Place a 165 mm diameter rigid sphere, with a mass of 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield glazing and the surface of the instrument panel, including padding. If any accessories or equipment such as the steering control system obstruct positioning of the sphere, remove them for the purposes of this procedure.
- (b) Draw the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the glazing material.
- (c) Draw a line on the inner surface of the windshield below and 13 mm distant from the locus line.
- (d) The lower edge of the protected zone is the longitudinal projection onto the outer surface of the windshield of the line determined in S6.1(c).

S6.2 Untitled

The protected zone is the space enclosed by the following surfaces, as shown in Figure 1:

- (a) The outer surface of the windshield in its pre-crash configuration.
- (b) The locus of points 76 mm outward along perpendiculars drawn to each point on the outer surface of the windshield.
- (c) The locus of lines forming a 45° angle with the outer surface of the windshield at each point along the top and side edges of the outer surface of the windshield and the lower edge of the protected zone determined in S6.1, in the plane perpendicular to the edge at that point.

S6.3 Untitled

A template is cut or formed from Styrofoam, type DB, cut cell, to the dimensions of the zone as determined in S6.2. The template is affixed to the windshield so that it delineates the protected zone and remains affixed throughout the crash test.

S7. Test conditions

The requirement of S5 shall be met under the following conditions:

S7.1 Untitled

The protected zone template is affixed to the windshield in the manner described in S6.

S7.2 Untitled

The hood, hood latches, and any other hood retention components are engaged prior to the barrier crash.

S7.3 Untitled

Adjustable cowl tops or other adjustable panels in front of the windshield are in the position used under normal operating conditions when windshield wiping systems are not in use.

S7.4 Untitled

The parking brake is disengaged and the transmission is in neutral.

S7.5 Untitled

Tires are inflated to the vehicle manufacturer's specifications.

S7.6 Untitled

The fuel tank is filled to any level from 90 to 95 per cent of capacity.

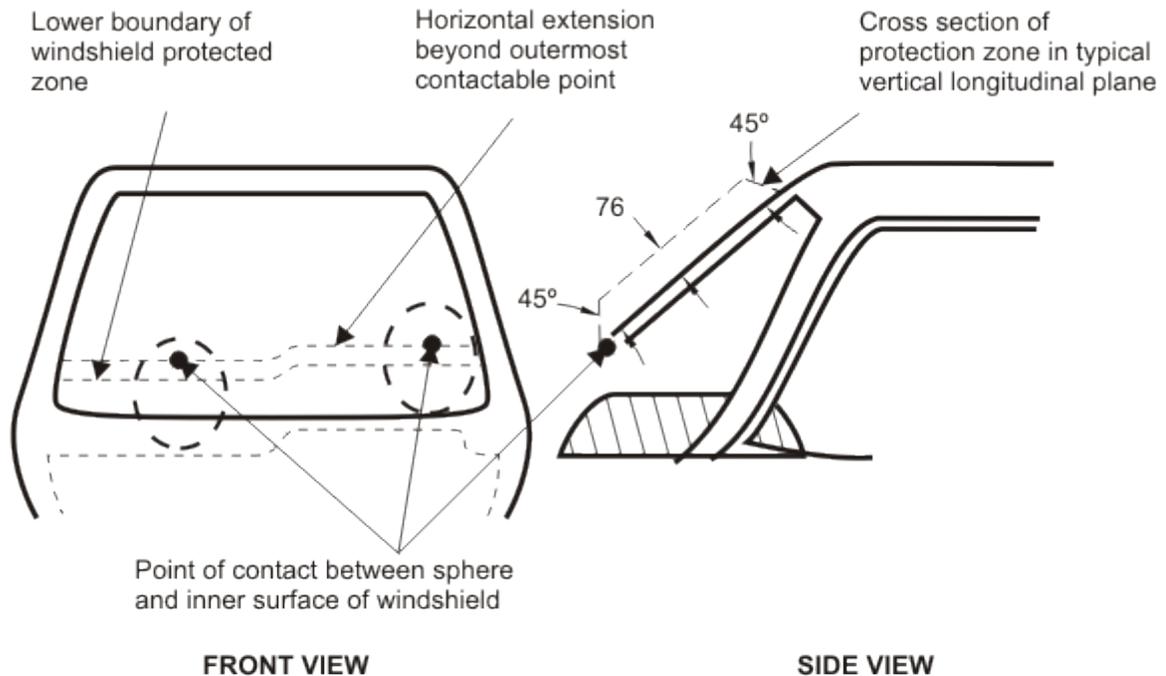
S7.7 Untitled

The vehicle, including test devices and instrumentation, is loaded as follows:

- (a) Except as specified in S7.6, a passenger car is loaded to its unloaded vehicle weight plus its ~~rated cargo-carrying and luggage~~ capacity weight, secured in the luggage area, plus a 50th-percentile test dummy as specified in Title 49, part 572 of the Code of Federal Regulations ~~this chapter~~ at each front outboard designated seating position and at any other position whose protection system is required to be tested by a dummy under the provisions of ~~Standard No.~~ section 208 of Schedule IV of the MVSR. Each dummy is restrained only by means that are installed for protection at its seating position.
- (b) Except as specified in S7.6, a multipurpose passenger vehicle, truck or bus is loaded to its unloaded vehicle weight, plus 136 kg or its ~~rated cargo-carrying and luggage~~ capacity, whichever is less, secured to the vehicle, plus a 50th-percentile test dummy as specified in Title 49, part 572 of the Code of Federal Regulations ~~this chapter~~ at each front outboard designated seating position and at any other position whose protection system is required to be tested by a dummy under the provisions of ~~Standard No.~~ section 208 of Schedule IV of the MVSR. Each dummy is restrained only by means that are installed for protection at its seating position. The load is distributed so that the mass on each axle as measured at the tire-ground interface is in proportion to its Gross Axle Weight Rating (GAWR). If the mass on any axle when

the vehicle is loaded to its unloaded vehicle weight plus dummy mass exceeds the axle's proportional share of the test mass, the remaining mass is placed so that the mass on that axle remains the same. For the purposes of this section, unloaded vehicle weight does not include the mass of work-performing accessories. Vehicles are tested to a maximum unloaded vehicle weight of 2,495 kg.

Figure 1 - Windshield Protection Zone



Notes:

1. Dimensions in mm
2. Not to scale