SLOVENSKI STANDARD
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Oprema cest - 3. del: Razredi uporabnosti, merila za preskušanje ob naletu in preskusne metode za blažilnike trkov

Road restraint systems - Part 3: Performance classes, impact test acceptance criteria and test methods for crash cushions

Rückhaltesysteme an Straßen - Teil 3: Leistungsklassen, Abnahmekriterien für Anprallprüfungen und Prüfverfahren für Anpralldämpfer

Dispositifs routiers de retenue - Partie 3: Atténuateurs de choc - Classes de performance, critere d'acceptation des essais de choc et méthodes d'essais

Ta slovenski standard je istoveten z: **EN 1317-3:2000**

ICS:

13.200	Preprečevanje nesreč in katastrof	Accident and disaster control
93.080.30	Cestna oprema in pomožne naprave	Road equipment and installations

SIST EN 1317-3:2002 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

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ICS 13.200; 93.080.30

English version

Road restraint systems - Part 3: Performance classes, impact test acceptance criteria and test methods for crash cushions

Dispositifs routiers de retenue - Partie 3: Atténuateurs de choc - Classes de performance, critère d'acceptation des essais de choc et méthodes d'essais

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This European Standard was approved by CEN on 10 April 2000.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 226 "Road equipment" the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2000, and conflicting national standards shall be withdrawn at the latest by November 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This European Standard consists of the following Parts under the general title : Road restraint systems.

- Part 1 : Terminologie and general criteria for test methods;

- Part 2 : Performance classes, impact test acceptance criteria and test methods for safety barriers;

- Part 3 : Performance classes, impact test acceptance criteria and test methods for crash cushions;

The following Parts have not yet available but in course of preparation:

- Part 4: Impact tests acceptance criteria and test methods for terminals and transitions of safety barriers;

- Part 5: Durability and evaluation of conformity;

- Part 6: Pedestrian road restraint system, pedestrian parapet.

Introduction

Based on safety considerations, the design of roads may require the installation of crash cushions at certain locations. These are designed to reduce the severity of vehicle impact with a more resistive object.

One objective of this standard is to lead to the harmonisation of current national standards and/or regulations for crash cushions and to categorize them into performance classes.

The standard specifies the levels of performance, required of crash cushions, for the restraint and/or redirection of impacting vehicles.

The impact severity of vehicles in collision with crash cushions is rated by the indices Theoretical Head Impact Velocity (THIV), Post-impact Head Deceleration (PHD) and Acceleration Severity Index (ASI) (see EN 1317-1).

The different performance levels will enable national and local authorities to specify the performance class of crash cushions. The type or class of road, its location, its geometrical layout, the existence of a vulnerable structure or potentially hazardous area adjacent to the road are factors to be taken into consideration.

Attention is drawn to the fact that the acceptance of a crash cushion will require the successful completion of a series of tests (see table 1, 2, 3, etc.).

Additional sensitive areas, including transitions to an obstacle or a safety barrier, should be considered for tests.

To ensure proper use of this Part of the standard, it is essential to consider all of the other Parts of this standard, especially Part 5 : Durability and attestation of conformity.

1 Scope

This European Standard specifies requirements for the performance of crash cushions from vehicle impacts. It specifies performance classes and acceptance criteria for impact tests.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 1317-1 Road restraint systems - Part 1 : Terminology and general criteria for test methods

ISO 6487 Road vehicles - Measurement techniques in impact tests - Instrumentation

ISO 10392 Road vehicles with two axles - Determination of centre of gravity

3 Abbreviations

ASI	Acceleration Severity Index
THIV	Theoretical Head Impact Velocity
PHD	Post-impact Head Deceleration

4 Definitions

For the purpose of this standard, the following definitions apply :

4.1 obstacle : The item being protected from vehicular impact by the presence of a crash cushion.

4.2 front face of the obstacle: The surface closest to a plane drawn perpendicular to the centre line of the crash cushion.

4.3 system type tested crash cushions: A System Type Tested Crash Cushion is a multiple performance product that can be assembled to form different models from the same set of components, to obtain different shapes and performances, with the same working mechanism for the system and its components.

5 Performance classes

5.1 Acceptance criteria

The acceptance of a crash cushion shall be determined as a function of the following performance criteria :

- vehicle impact severity ;
- vehicle trajectory ;
- projection and distribution of test vehicle and crash cushion debris ;
- containment level
- crash cushion deflection.

NOTE See clause 6 for further details.

5.2 Velocity classes

Velocity classes shall be :

- 50 km/h ;
- 80 km/h ;
- 100 km/h ;
- 110 km/h.

5.3 Types of crash cushion

Types of crash cushion shall be :

- redirective (R) : crash cushions which retain and redirect vehicles ;

- non redirective (NR) : crash cushions which retain but do not redirect vehicles.

Vehicle impact test criteria shall be as given in table 1.

Table 1 - Vehicle impact test criteria for crash cushions

Test [1]	Approach	Total vehicle mass kg	Velocity km/h	Figure 1 Test N°
TC 1.1.50	Head-on centre	900	50	1
TC 1.1.80		900	80	
TC 1.1.100		900	100	
TC 1.2.80		1300	80	1
TC 1.2.100			100	
TC 1.3.110		1500	110	1
TC 2.1.80	Head-on, ¼ vehicle offset	900 [2]	80	2
TC 2.1.100			100	
TC 3.2.80	Nose (centre), at 15°	1300	80	3
TC 3.2.100		1300	100	
TC 3.3.110		1500	110	
TC 4.2.50	Side impact at 15°	1300	50	4
TC 4.2.80		1300	80	
TC 4.2.100		1300	100	
TC 4.3.110		1500	110	
TC 5.2.80	Side impact at 165°	1300	80	5
TC 5.2.100		1300	100	
TC 5.3.110		1500	110	

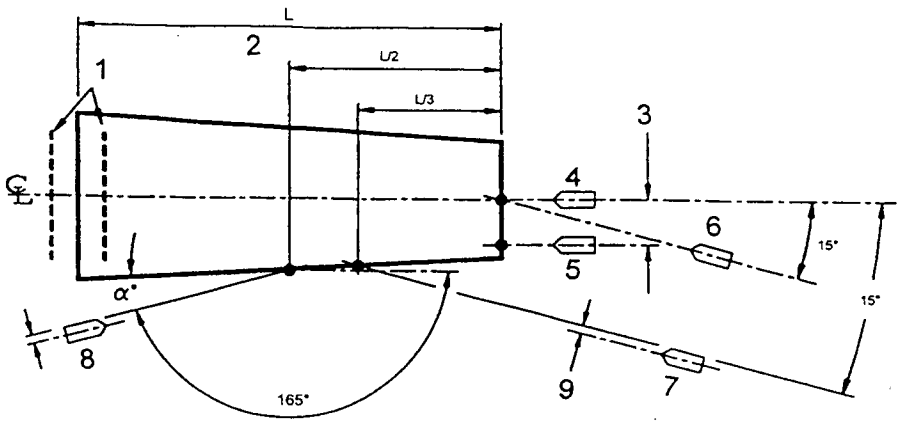
[1] Test notation is as follows :

TC	**1**	**2**	**80**
Test of crash cushion	Approach	Test vehicle mass	Impact speed

[2]) For this test condition, the dummy is to be located at the more distant location from the centre line of crash cushion.

NOTE 1 Vehicle specifications and tolerances are specified in EN 1317-1.

NOTE 2 Test 5 will not be run for a crash cushion of non-parallel form when, at the relevant impact point, the angle (α) of the vehicle path to the traffic face of the crash cushion is less than 5°.



Key

1 Alternative locations for front face of obstacle
2 Crash cushion
3 ¼ vehicle width offset for test 2
4 Test 1
5 Test 2
6 Test 3
7 Test 4
8 Test 5
9 ½ vehicle width

Figure 1 - Vehicle approach paths for tests 1 to 5.

The crash cushion performance classes shall be as given in table 2 and table 3. These are classified according to an increasing energy absorption capacity. A successfully tested crash cushion at a given performance level, shall be considered as having met the test conditions of lower levels unless a device is present which may not function in an acceptable manner at a lower impact velocity. In this case, an additional test is required to demonstrate its performance ; this additional test shall be determined by the approved body responsible for initial type testing of the product.

Table 2 - Performance levels for redirective crash cushions.

Level	Acceptance test					
50	TC 1.1.50	-	-	-	TC 4.2.50	-
80/1	-	TC 1.2.80	TC 2.1.80	-	TC 4.2.80	-
80	TC 1.1.80	TC 1.2.80	TC 2.1.80	TC 3.2.80	TC 4.2.80	TC 5.2.80*
100	TC 1.1.100	TC 1.2.100	TC 2.1.100	TC 3.2.100	TC 4.2.100	TC 5.2.100*
110	TC 1.1.100	TC 1.3.110	TC 2.1.100	TC 3.3.110	TC 4.3.110	TC 5.3.110*

NOTE 1 Tests marked (*) will not be required where this vehicle approach is not possible (e.g. when traffic is in one direction only or at a toll booth/gate).

NOTE 2 For class 80/1 the number of tests required is reduced and the Acceleration Severity Index, crash cushion deformation and vehicle behaviour are not comparable to class 80.