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**Oprema cest - 7. del: Razredi uporabnosti, merila za preskušanje ob naletu in preskusne metode za zaključnice in elemente varnostnih ograj**

Road restraint systems - Part 7: Performance classes, impact test acceptance criteria and test methods for terminals of safety barriers

Rückhaltesysteme an Straßen - Teil 7: Leistungsklassen, Abnahmekriterien für Anprallprüfungen und Prüfverfahren für Anfangs- und Endkonstruktionen für Schutzeinrichtungen

Dispositifs de retenue routiers - Partie 7 : Classes de performance, critères d'acceptation des essais de choc et méthodes d'essai pour les extrémités des barrières de sécurité

**Ta slovenski standard je istoveten z: prEN 1317-7**

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93.080.30	Cestna oprema in pomožne naprave	Road equipment and installations

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 1317-7**

June 2012

ICS 93.080.30

Will supersede ENV 1317-4:2001

English Version

**Road restraint systems - Part 7: Performance classes, impact  
test acceptance criteria and test methods for terminals of safety  
barriers**

Dispositifs de retenue routiers - Partie 7 : Classes de  
performance, critères d'acceptation des essais de choc et  
méthodes d'essai pour les extrémités des barrières de  
sécurité

Rückhaltesysteme an Straßen - Teil 7: Leistungsklassen,  
Abnahmekriterien für Anprallprüfungen und Prüfverfahren  
für Anfangs- und Endkonstruktionen für  
Schutzeinrichtungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 226.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (prEN 1317-7:2012) has been prepared by Technical Committee CEN/TC 226 “Road equipment”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document, with and only with prEN 1317-4:2012, will supersede ENV 1317-4:2001.

This draft part of EN 1317 does not (and cannot) replace ENV 1317-4:2001 in isolation

EN 1317, *Road restraint systems*, consists of the following parts:

- Part 1: Terminology and general criteria for test methods;
- Part 2: Performance classes, impact test acceptance criteria and test methods for safety barriers including vehicle parapets;
- Part 3: Performance classes, impact test acceptance criteria and test methods for crash cushions;
- Part 4: Performance classes, impact test acceptance criteria and test methods for transitions and removable barriers sections;
- Part 5: Road restraint systems – Product requirements and evaluation of conformity for vehicle restraint systems;
- Part 6: Pedestrian restraint system – Pedestrian restraint systems – Pedestrian parapets (CEN/TR);
- Part 7: Performance classes, impact test acceptance criteria and test methods for terminals of safety barriers;
- Part 8: Motorcycle road restraint systems which reduce the impact severity of motorcyclist collisions with safety barriers (CEN/TS).

This part of EN 1317 is to be read in conjunction with EN 1317-1.

## Introduction

The design purpose of safety barriers installed on roads is to contain errant vehicles that either leave the carriageway or are likely to encroach into the path of oncoming vehicles. EN 1317-2 deals with the impact performance of a safety barrier to which a terminal may be attached.

Terminals, which are defined as the beginning and/or end treatment of a safety barrier, are required to have specified impact performances without introducing additional hazards for passenger cars.

The description of a terminal conforming to this European Standard incorporates the relevant classes and performance levels of the product.

Manufacturers may wish to modify their products or use them with different barriers following the ITT and 5.3, 6.2.1.5 and Annex A of EN 1317-5:2007+A2:2012 set out the procedure to be followed.

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## 1 Scope

This part of EN 1317 specifies requirements on the impact performance of terminals, performance classes, lateral displacement, vehicle redirection classes, terminal direction classes, VCDI and impact severity levels.

NOTE This European Standard should be read in conjunction with EN 1317-1. Both these standards support EN 1317-5.

The modifications included in this European Standard are not a change of test criteria, in the sense of the EN 1317-5:2007+A2:2012, ZA.3.

The performance of a terminal in general is dependent on the barrier connected.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1317-1:2010, *Road restraint systems – Part 1: Terminology and general criteria for test methods*

EN 1317-5:2007+A2:2012, *Road restraint systems – Part 5: Product requirements and evaluation of conformity for vehicle restraint systems*

## 3 Abbreviations iTeh STANDARD PREVIEW

For the purposes of this document, the following abbreviations apply.

ASI:	Acceleration severity index
BDT:	Bi-directional terminal
CIP:	Critical Impact Point
DT:	Double sided terminal
EAT:	Energy Absorbing Terminal
Lb:	Length of barrier connected to a terminal
Ld:	Length of terminal deformation
Ls:	Structural length of a terminal
Lt:	Total length of a terminal
NEA:	Non-energy Absorbing Terminal
ST:	Single sided terminal
THIV:	Theoretical head impact velocity
UDTA:	Uni-directional terminal approach
UDTD:	Uni-directional terminal departure
VCDI:	Vehicle cockpit deformation index

**prEN 1317-7:2012 (E)**

For the purposes of this document, test vehicle mass codes are

- 1 900 kg,
- 2 1 300 kg,
- 3 1 500 kg.

**4 Terms and definitions**

For the purposes of this document, the following terms and definitions apply.

**4.1**  
**terminal**  
treatment of the beginning and/or end of a safety barrier to reduce hazards for passenger cars that would result from the use of an un-treated beginning or end of the barrier (or other construction)

Note 1 to entry: In addition, it can provide an anchorage for the barrier system.

**4.2**  
**single sided terminal**  
terminal which has performance in accordance with this European Standard, on one side only

**4.3**  
**double-sided terminal**  
terminal which has performance in accordance with this European Standard, on both sides

**4.4**  
**datum point**  
structural beginning of a terminal i.e. the first point at which the terminal offers significant resistance to a frontal impact

**4.5**  
**total length of a terminal**  
**L<sub>t</sub>**  
total length of the terminal including structural and non-structural components

**4.6**  
**structural length of a terminal**  
**L<sub>s</sub>**  
longitudinal distance from the terminal datum point to the end of the terminal

Note 1 to entry: The length of a terminal is measured in the direction of the traffic side of the barrier. The length is shown diagrammatically in Figure 3.

**4.7**  
**length of a connecting barrier**  
**L<sub>b</sub>**  
length L<sub>b</sub> of a barrier meeting the requirements of EN 1317-1 and EN 1317-2 and fixed to a terminal for the ITT, including connections

**4.8**  
**length of terminal deformation**  
**L<sub>d</sub>**  
maximum dynamic longitudinal displacement of the terminal datum point after Approach 1 test



**4.9****energy absorbing terminal****EAT**

terminal which in the test Approach 1 (or 2 for T80/1) does not allow the most forward point of the car to cross the vehicle exit line R (see Figure 6), or which crosses line R at a speed less than or equal to 11 km/h.

**4.10****non-energy absorbing terminal****NEA**

terminal which in the test Approach 1 (or 2 for T80/1) allows the most forward point of the car to cross the vehicle exit line R (see Figure 6), or which crosses line R at a speed greater than 11 km/h

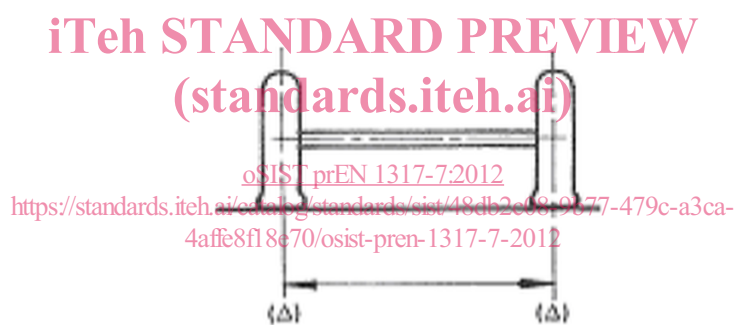
**4.11****family of terminals****system type tested terminal**

multiple performance product that can be assembled to form different models from the same set of components, to obtain performances in different classes, with the same working mechanism for the system and for its components

**4.12****wheel track**

distance between the centres of tyre contact of the two wheels of an axle, projected on to the YZ plane

Note 1 to entry: See Figure 1.

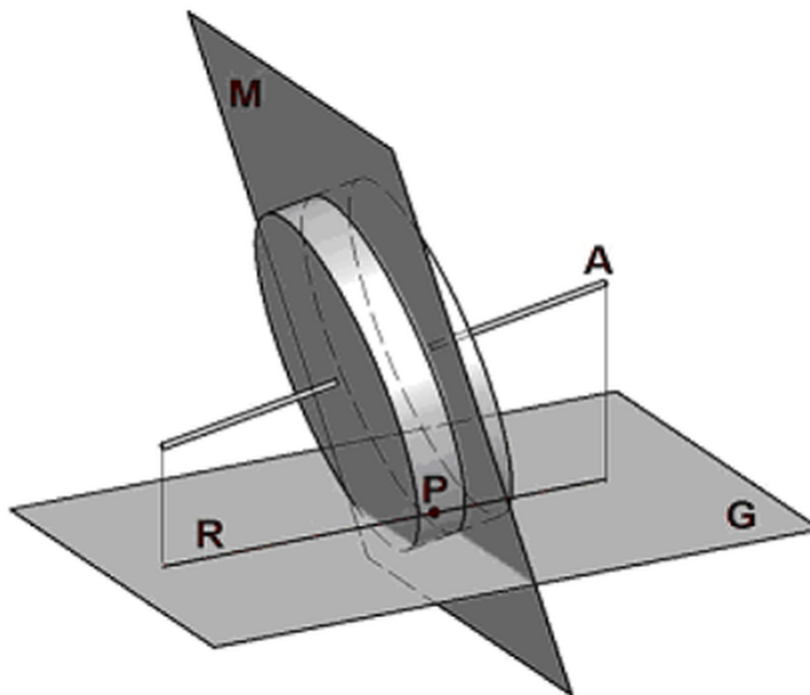


**Figure 1 – Example of wheel track**

**4.13****centre of tyre contact**

P centre of tyre contact

Note 1 to entry: See Figure 2

**Key**

- A wheel spin axis
- G ground plane
- M wheel mid plane
- R projection of A on G
- P centre of tyre contact

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**Figure 2 – Centre of tyre contact**

**4.14****critical impact point**

impact point identified to reasonably represent the worst case for testing

**4.15****uni-directional terminal – approach****UDTA**

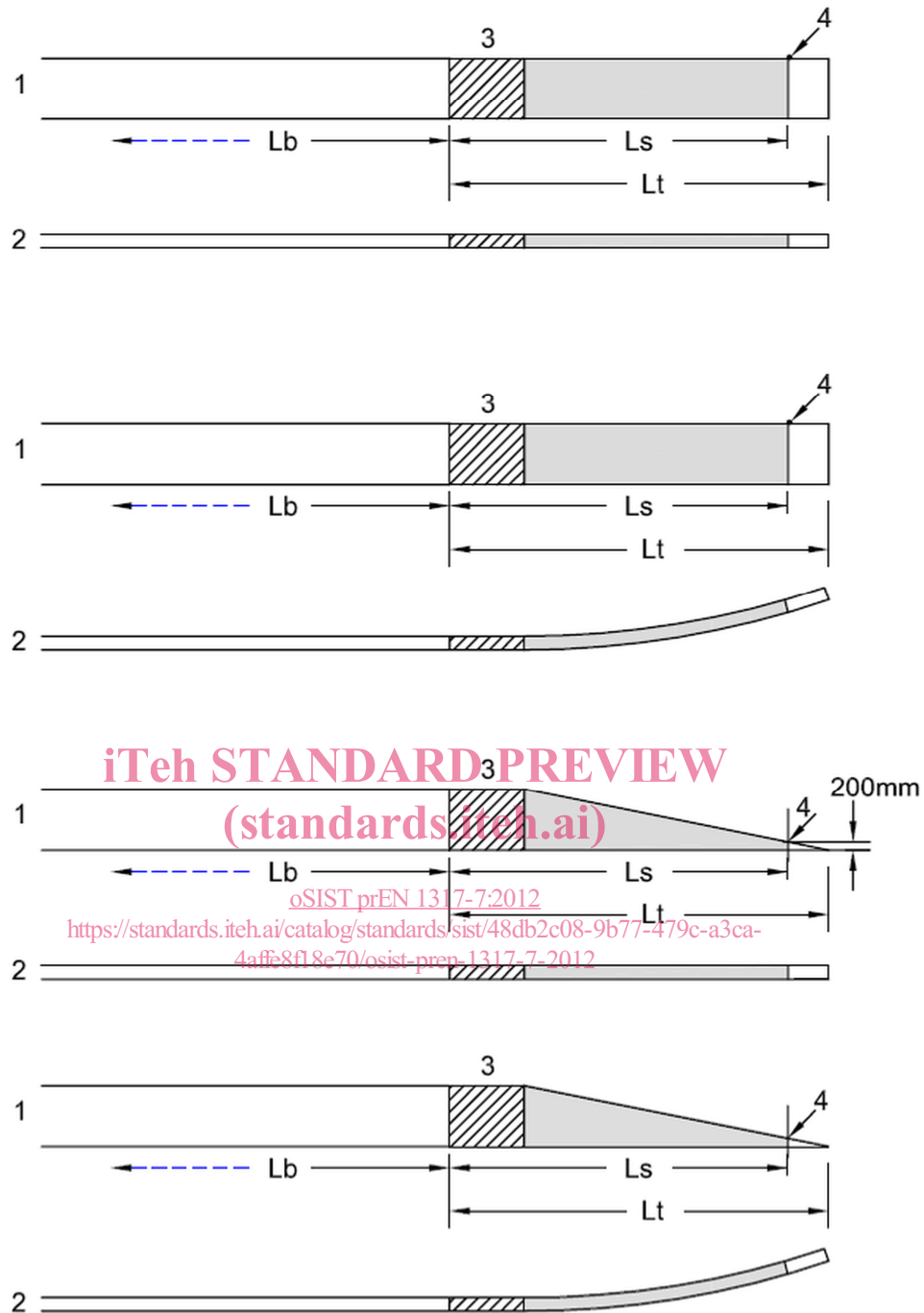
terminal designed and tested to perform at the approach end of a barrier only

**4.16****uni-directional terminal – departure****UDTD**

terminal designed and tested to perform at the departure end of a barrier only

**4.17****bi-directional terminal (BDT)**

terminal designed and tested to perform in two directions

**Key**

- 1 side view
- 2 plan view
- 3 minimum length of connecting barrier required as part of the working mechanism of the terminal in Approach 1 test
- 4 datum point

**Figure 3 – Diagram of a Terminal**

## 5 Terminal performance

### 5.1 Performance classes

Terminals shall be tested in accordance with Table 1 and Table 2. The performance classes given in Table 1 are classified according to an increasing containment capacity.

Some designs may incorporate a non-structural beginning (nose) which offers no significant resistance to an impact. The first point at which the terminal offers significant resistance to an impact with Approach 1 is defined as the datum point. For performance classes T50 and T80/1, this information can be derived from Approach 2.

For sloped down terminals, the terminal datum point shall be defined as the first point 200 mm above ground level.

The datum point is defined by the manufacturer, checked by the test house performing the test, and justified in the test report.

If no agreement is reached between the manufacturer and the test house regarding the definition of the datum point, the test can be performed according to the manufacturer's definition and a note shall be added to the test report outlining the diverging points of view.

If a part of the barrier overlaps with the terminal or is required to deform in a controlled manner as part of the normal functioning of the terminal, then this length of the barrier shall be included in  $L_s$ . It shall also be considered the length to reach the barrier height, in sloped down systems.

The total length of the terminal ( $L_t$ ) shall conform to the design specification. For tests, the terminal shall be installed with the terminal manufacturer's minimum specified length of safety barrier ( $L_b$ ) so as to demonstrate the full performance of the terminal. The same barrier type shall be used within all of the testing for a particular terminal product.

In the case described in 6.3.2 for tests with Approach 1, the terminal can be installed without safety barrier.

A terminal in any of the classes T50 to T110 may also belong to the class 'energy absorbing terminal' when it fulfils the criteria given in 5.5.3.2.

**NOTE** Some of the performances of terminals are common to crash cushions. Accordingly, some of the tests specified for terminals in this European Standard have the same impact conditions specified in EN 1317-3 for crash cushions. Nevertheless, some other tests are different. The main differences between terminals and crash cushions are

- a terminal is designed to be installed at the beginning and/or at the end of a barrier,
- a terminal must be smoothly joined to a barrier, with no risk of snagging or pocketing,
- in general a terminal is designed to provide an anchorage to the barrier and to have adequate reaction to the axial push from the barrier,
- a crash cushion is usually not connected to the obstacle that it protects,
- a crash cushion is always energy absorbing while a terminal can be NEA.

Table 1 – Vehicle impact test configurations and performance classes

Performance class	Tests				
	Approach	Approach reference Figure 4	Vehicle mass kg	Velocity km/h	Test code <sup>a</sup>
T50	frontal, 0°, offset by ¼ of the vehicle width to the traffic side	2	900	50	TT2.1.50
T80/1	frontal, 0°, offset by ¼ of the vehicle width to the traffic side	2	900	80	TT2.1.80
	side, 15° 2/3 Ls	4	1 300	80	TT4.2.80
	side, 165° 1/2 Ls	5	900	80	TT5.1.80
	side, 165° at the critical impact point	6	1 300	80	TT6.2.80
T80	frontal, 0°, head centred	1	1 300	80	TT1.2.80
	frontal, 0°, offset by ¼ of the vehicle width to the traffic side	2	900	80	TT2.1.80
	head (centre) at 15°	3	1 300	80	TT3.2.80
	side, 15° 2/3 Ls	4	1 300	80	TT4.2.80
	side, 165° 1/2 Ls	5	900	80	TT5.1.80
	side, 165° at the critical impact point	6	1 300	80	TT6.2.80
T100	frontal, 0°, head centred	1	1 300	100	TT1.2.100
	frontal, 0°, offset by ¼ of the vehicle width to the traffic side	2	900	100	TT2.1.100
	head (centre) at 15°	3	1 300	100	TT3.2.100
	side, 15° 2/3 Ls	4	1 300	100	TT4.2.100
	side, 165° 1/2 Ls	5	900	100	TT5.1.100
	side, 165° at the critical impact point	6	1 300	100	TT6.2.100
T110	frontal, 0°, head centred	1	1 500	110	TT1.3.110
	frontal, 0°, offset by ¼ of the vehicle width to the traffic side	2	900	100	TT2.1.100
	head (centre) at 15°	3	1 500	110	TT3.3.110
	side, 15° 2/3 Ls	4	1 500	110	TT4.3.110
	side, 165° 1/2 Ls	5	900	100	TT5.1.100
	side, 165° at the critical impact point	6	1 500	110	TT6.3.110
<sup>a</sup> Test code notation is as follows: <div> <div>TT</div> <div>1</div> <div>2</div> <div>100</div> <div>Test of Terminal</div> <div>Approach</div> <div>Test vehicle mass</div> <div>Impact speed</div> </div>					