



SLOVENSKI STANDARD

SIST EN 1317-1:2010

01-november-2010

Nadomešča:
SIST EN 1317-1:1999

Oprema cest - 1. del: Terminologija in splošna merila za preskusne metode

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

Rückhaltesysteme an Straßen - Teil 1: Terminologie und allgemeine Kriterien für Prüfverfahren

Dispositifs de retenue routiers - (Partie 1: Terminologie et dispositions générales pour les méthodes d'essai

iTeh STANDARD PREVIEW

(standards.iteh.ai)

[SIST EN 1317-1:2010](https://standards.iteh.ai/catalog/standards/sist/eb04243c-7ff-47b-80ff-427b31a/sist-en-1317-1-2010)

<https://standards.iteh.ai/catalog/standards/sist/eb04243c-7ff-47b-80ff-427b31a/sist-en-1317-1-2010>

Ta slovenski standard je istoveten z EN 1317-1:2010

ICS:

01.040.93	Nizke gradnje (Slovarji)	Civil engineering (Vocabularies)
93.080.30	Cestna oprema in pomožne naprave	Road equipment and installations

SIST EN 1317-1:2010

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 1317-1:2010

<https://standards.iteh.ai/catalog/standards/sist/eb04243c-7ff-47f3-80ff-de2c4be7f31a/sist-en-1317-1-2010>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1317-1

July 2010

ICS 01.040.93; 93.080.30

Supersedes EN 1317-1:1998

English Version

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

Dispositifs de retenue routiers - Partie 1 : Terminologie et dispositions générales pour les méthodes d'essai

Rückhaltesysteme an Straßen - Teil 1: Terminologie und allgemeine Kriterien für Prüfverfahren

This European Standard was approved by CEN on 29 April 2010.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

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 CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 1317-1:2010](https://standards.iteh.ai/catalog/standards/sist/eb04243c-7ff-47b-80ff-de2c4be7b1a/sist-en-1317-1-2010)

<https://standards.iteh.ai/catalog/standards/sist/eb04243c-7ff-47b-80ff-de2c4be7b1a/sist-en-1317-1-2010>



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	3
Introduction	5
1 Scope	6
2 Normative references	6
3 Abbreviations	6
4 Terms and definitions	7
5 Test methods.....	10
5.1 Test site	10
5.2 Test vehicles	11
5.2.1 General.....	11
5.2.2 Loading conditions.....	11
6 Vehicle Instrumentation	13
6.1 Vehicle Instrumentation required for the calculation of ASI and THIV	13
6.2 Frequency requirements.....	13
6.3 Compensation for instrumentation displaced from the vehicle centre of mass.....	13
7 Data Processing and Analysis	15
8 Test Results and Calculations.....	17
8.1 Severity Indices.....	17
8.1.1 General.....	17
8.1.2 Summary of the procedure to compute ASI.....	17
8.1.3 Procedure to compute THIV	18
8.2 Vehicle cockpit deformation index (VCDI)	24
8.2.1 Deformation.....	24
8.2.2 Location of the deformation	24
8.2.3 Extent of the deformation	25
8.2.4 Examples (informative)	27
Annex A (informative) Calculation of the acceleration severity index (ASI)	28
Annex B (informative) Vehicle acceleration - Measurement and calculation methods	29
B.1 Introduction	29
B.2 Acceleration in a rigid body.....	29
B.3 Methods of measuring rigid body motion.....	30
B.4 Measurement by six linear and three angular transducers.....	31
B.5 Remarks	35
Bibliography.....	36

Foreword

This document (EN 1317-1:2010) has been prepared by 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 January 2011, and conflicting national standards shall be withdrawn at the latest by January 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1317-1:1998.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

EN 1317 consists of the following parts:

- EN 1317-1, *Road restraint systems — Part 1: Terminology and general criteria for test methods*;
- EN 1317-2, *Road restraint systems — Part 2: Performance classes, impact test acceptance criteria and test methods for safety barriers including vehicle parapets*;
- EN 1317-3, *Road restraint systems — Part 3: Performance classes, impact test acceptance criteria and test methods for crash cushions*;
- ENV 1317-4, *Road restraint systems — Part 4: Performance classes, impact test acceptance criteria and test methods for terminals and transitions of safety barriers*;
- prEN 1317-4, *Road restraint systems — Part 4: Performance classes, impact test acceptance criteria and test methods for transitions of safety barriers* (under preparation: this document will supersede ENV 1317-4:2001 for the clauses concerning transitions);
- EN 1317-5, *Road restraint systems — Part 5: Product requirements and evaluation of conformity for vehicle restraint systems*;
- prEN 1317-6, *Road restraint systems — Pedestrian restraint systems — Part 6: Pedestrian Parapet* (under preparation);
- prEN 1317-7, *Road restraint systems — Part 7: Performance classes, impact test acceptance criteria and test methods for terminals of safety barriers* (under preparation: this document will supersede ENV 1317-4:2001 for the clauses concerning terminals);
- prEN 1317-8, *Road restraint systems — Part 8: Motorcycle road restraint systems which reduce the impact severity of motorcyclist collisions with safety barriers* (under preparation).

Annexes A and B are informative.

The significant technical changes incorporated in this revision are:

5 Test methods

EN 1317-1:2010 (E)

The specifications for the test site and test vehicles have been moved from Parts 2 and 3 to Part 1.

6.1 Vehicle instrumentation required for the calculation of ASI and THIV

The requirement of the 1998 text:

Vehicle acceleration shall be measured at a single point (P) within the vehicle body close to the vehicle centre of gravity.

is replaced by:

The accelerometers shall be mounted at a single point (P) on the tunnel close to the vertical projection of vehicle centre of mass of the undeformed vehicle, but no further than 70 mm longitudinally and 40 mm laterally. Measurements made before the publication of the present standard, with accelerometers fixed to an installation close to the centre of mass are accepted.

6.2 Frequency requirements

The following new requirement has been introduced:

Since the data will be filtered by recursive (Butterworth) filters, more data should be collected than is specifically required by the analysis. A recursive filter always produces "starting transients" at the beginning and end of the data, and requires time to "settle down". An additional 500 ms of data shall be collected at the beginning and end of the data; this extra data can then be discarded after filtering.

6.3 Compensation for instrumentation displaced from the vehicle centre of mass

The procedure has been extended also to the cases of non-null roll angle and roll velocity and when the three points Q₁, Q₂, P (P₁, P₂, P in the 1998 text) are aligned along any straight line.

8.1 Severity Indices

<https://standards.iteh.ai/catalog/standards/sist/eb04243c-7ff-47b-80ff-de2c4be7b31a/sist-en-1317-1-2010>

The requirement for the index PHD (Post impact Head Deceleration) has been removed. ASI and THIV are required.

8.1.1 Summary of the procedure to compute ASI

In the procedure to compute ASI, averaging of the three components of the acceleration over a moving window of 50 ms has been replaced by filtering with a four-pole phaseless Butterworth digital filter.

8.2 Vehicle cockpit deformation index (VCDI)**8.2.2 Location of the deformation**

The prefix 'ND' has been added for impacts where there is no deformation of the vehicle cockpit.

8.2.3 Extent of the deformation

"The sub-index 3 has been added for reductions greater than 20 %, or measurements which cannot be taken due to the deformation of the vehicle."

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

In order to improve and maintain highway safety, the design of safer roads requires, on certain sections of road and at particular locations, the installation of road restraint systems. These road systems are designated to redirect errant vehicles with a specified performance level and can provide guidance for pedestrians or other road users.

This European Standard is a revision of EN 1317-1:1998. The standard identifies test methods and impact test acceptance criteria that the products for road restraint systems need to meet to demonstrate compliance with the requirements, given in EN 1317-5 and/or prEN 1317-6. The design specification, for road restraint systems entered in the test report, identify important functional site conditions in respect of the test installation.

The performance range of the products for road restraint systems, designated in this standard, enables national and local authorities to recognize and specify the performance class to be deployed.

Annexes A and B give informative explanation of the measurement of the severity index ASI and vehicle acceleration.

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 1317-1:2010

<https://standards.iteh.ai/catalog/standards/sist/eb04243c-7fff-47f3-80ff-de2c4be7f31a/sist-en-1317-1-2010>

EN 1317-1:2010 (E)**1 Scope**

This European Standard contains provisions for the measurement of performance of products for the road restraint systems, under impact and impact severity levels, and includes:

- Test site data;
- Definitions for road restraint systems;
- Vehicle specification (including loading requirements) for vehicles used in the impact tests;
- Instrumentation for the vehicles;
- Calculation procedures and methods of recording crash impact data including impact severity levels;
- VCDI.

The modifications included in this standard are not a change of test criteria, in the sense of EN 1317-5:2007+A1:2008, ZA.3.

2 Normative references

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

EN 1317-2, *Road restraint systems — Part 2: Performance classes, impact test acceptance criteria and test methods for safety barriers including vehicle parapets*

EN 1317-3, *Road restraint systems — Part 3: Performance classes, impact test acceptance criteria and test methods for crash cushions*

ENV 1317-4, *Road restraint systems — Part 4: Performance classes, impact test acceptance criteria and test methods for terminals and transitions of safety barriers*

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
ATD:	Anthropomorphic Test Device
CAC:	Channel Amplitude Class
CFC:	Channel Frequency Class
COG:	Centre of mass
HGV:	Heavy Goods Vehicle
PRS:	Pedestrian Restraint System

RRS:	Road Restraint System
THIV:	Theoretical Head Impact Velocity
VCDI:	Vehicle Cockpit Deformation Index
VRS:	Vehicle Restraint System

4 Terms and definitions

The types of system are shown in Figure 1.

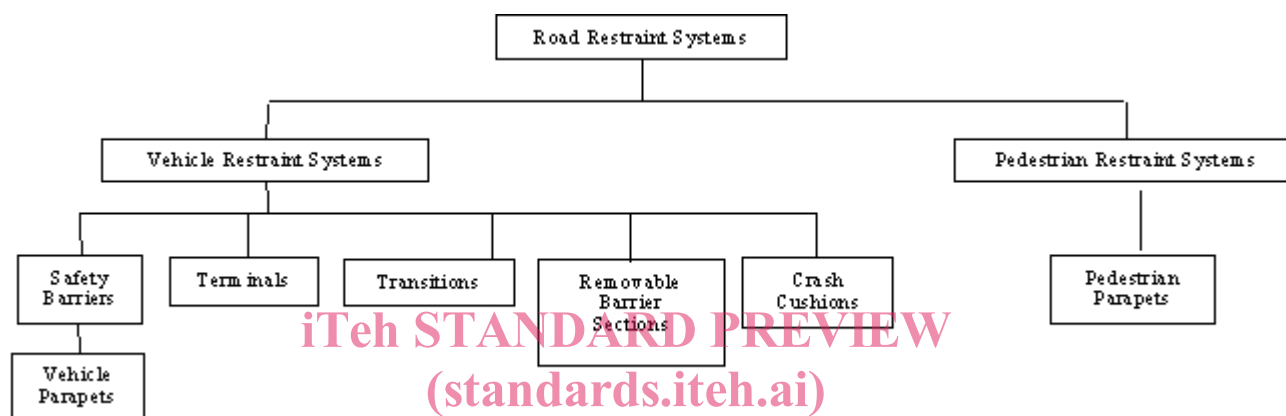


Figure 1—Types of system

<https://standards.iteh.ai/catalog/standards/sist/eb04243c-7ff-47b3-80ff-424b1e111111>

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

4.1

road restraint system

vehicle restraint system and pedestrian restraint system used on the road

4.2

vehicle restraint system

system installed on the road to provide a level of containment for an errant vehicle

4.3

safety barrier

continuous vehicle restraint system installed alongside, or on the central reserve, of a road

NOTE This can include a vehicle parapet.

4.4

terminal

end treatment of a safety barrier

4.5

transition

connection of two safety barriers of different designs and/or performances

EN 1317-1:2010 (E)**4.6****vehicle parapet**

safety barrier installed on the side of a bridge or on a retaining wall or similar structure where there is a vertical drop and which can include additional protection and restraint for pedestrians and other road users (combined vehicle/pedestrian parapet)

4.7**crash cushion**

road vehicle energy absorption device installed in front of one or more hazards to reduce the severity of impact

4.8**pedestrian restraint system**

system installed to provide restraint for pedestrians

4.9**pedestrian parapet**

pedestrian or "other user" restraint system along the edge of a footway or footpath intended to restrain pedestrians and other users from stepping onto or crossing a road or other area likely to be hazardous

NOTE "Other users" include provision for equestrians, cyclists and livestock.

4.10**kerb mass**

vehicle as delivered, including all fluids

4.11**test inertial mass**

kerb mass plus ballast and recording and brake equipment but excluding dummy

4.12**total mass**

mass that includes all items in the test vehicle at the beginning of the test

4.13**combined vehicle/pedestrian parapet**

vehicle parapet with additional safety provisions for pedestrians and/or other road users

4.14**wheel base**

distance between the centres of tyre contact of the two wheels on the same side of the vehicle, projected onto the longitudinal centreline of the vehicle

NOTE For vehicles with more than two axles, the wheel bases between extreme axles.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 1317-1:2010

<https://standards.iteh.ai/catalog/standards/sist/eb04243c-7ff-47b-80ff-de2c4be7b31a/sist-en-1317-1-2010>

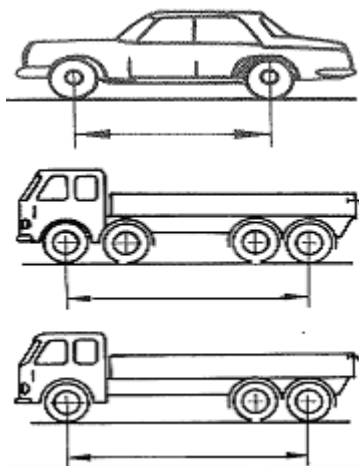


Figure 2 — Examples of wheel base

4.15

wheel track

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

NOTE In the case of dual wheels, it is the point centrally located between the centres of tyre contact of the two wheels of the dual axle.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 1317-1:2010
<https://standards.iteh.ai/catalog/standards/sis/eb04243c-7ff-47b-80ff-de2c4b97b31a/sist-en-1317-1-2010>

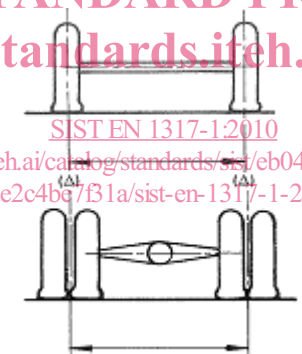


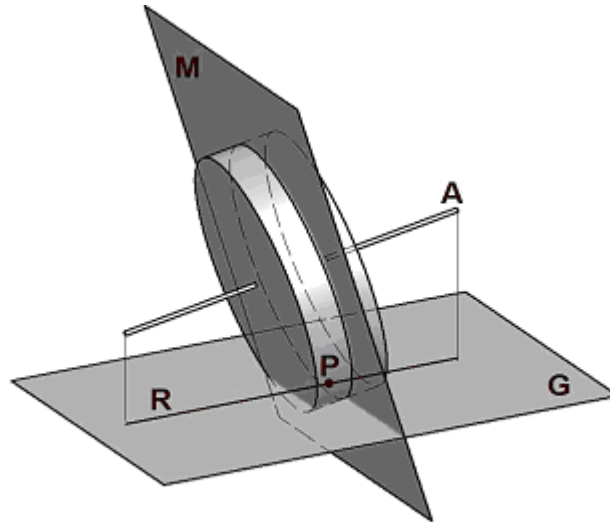
Figure 3 — Examples of wheel track

4.16

centre of tyre contact

P centre of tyre contact (or central plane between two tyres for dual axle vehicles)

NOTE See Figure 4.

**Key**

A	Wheel Spin Axis
G	Ground Plane
M	Wheel Mid Plane
R	Projection of A on G
P	Centre of Tyre Contact

iTeh STANDARD PREVIEW
Figure 4 — Centre of tyre contact
 (standards.iteh.ai)

4.17 anthropomorphic test device

anthropomorphic device representative of a 50th percentile adult male, specifically designed to represent in form, size and mass, a vehicle occupant, and to reproduce the dynamic behaviour of an occupant in crash testing

4.18 removable barrier section

section of a barrier connected at both ends to permanent barriers in order to be removed or displaced wholly or in parts that allows a horizontal opening to be provided

4.19 pre-tensioned system

main longitudinal element(s) of a barrier pre-tensioned to obtain the design performance

5 Test methods

5.1 Test site

The vehicle approach and exit box areas shall be generally flat with a gradient not exceeding 2,5 %. It shall have a level hardened paved surface and shall be clear of dust, debris, standing water, ice or snow at the time of the test. It shall be of sufficient size to enable the test vehicle to be accelerated up to the required speed and controlled so that its approach to and exit from the vehicle restraint system is stable.

Dimensioned sketch plan(s) of the test area shall be included in the test report which shall show the testing area including the road restraint product tested, position of all cameras, path of the vehicle, impact point and the dimensioned locations for all test item parts exceeding 2,0 kg that broke away during the test. For tests which have been performed prior to EN 1317-1:2010, such dimensioned sketch plans are not obligatory.