

Road restraint systems

Part 1: Terminology and general criteria for test methods

The European Standard EN 1317-1:1998 has the status of a
British Standard

ICS 01.040.13; 01.040.93; 13.200; 93.080.30

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National foreword

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The UK participation in its preparation was entrusted by Technical Committee B/509, Road equipment, to Subcommittee B/509/1, Road restraint systems, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

This Part of BS EN 1317, together with Part 2 and the proposed Parts 3, 4 and 5, will collectively eventually supersede BS 6779 which will then be withdrawn. This is expected to take place by the end of 2000.

Cross-references

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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'essais

Rückhaltesysteme an Straßen —

Teil 1: Terminologie und allgemeine Kriterien für
Prüfverfahren

This European Standard was approved by CEN on 5 March 1998.

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CEN

European Committee for Standardization
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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 consists of the following parts under the general title *Road restraint systems*.

Part 1: *Terminology and general criteria for test methods*;

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

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

The following parts are not yet available but are in the course of preparation:

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

Part 5: *Durability criteria and evaluation of conformity*;

Part 6: *Pedestrian road restraint system*.

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 October 1998, and conflicting national standards shall be withdrawn at the latest by October 1998.

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.

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Introduction

In order to improve and maintain highway safety, the design of safer roads requires the installation, on certain sections of road and at particular locations, of devices to restrain vehicles and pedestrians from entering dangerous zones or areas. The road restraint systems designated in this standard are designed to specified performance levels of containment, to redirect errant vehicles and to provide guidance for pedestrians or other road users.

The objective of this standard is to provide a procedure whereby the present national standards and regulations, which currently pertain in member countries, can be harmonized to a common European Standard.

Many types of road restraint systems are available; their characteristics differ both by function and by on-road use. European standardization requires common terminology in order to provide a clear understanding of the design, performance, production and construction of the various road restraint systems. This standard identifies impact test tolerances and vehicle behaviour criteria that need to be met to gain approval. The design specification, for road restraint systems entered in the test report, should identify the on-road site conditions under which the road restraint system should be installed.

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

The range of possible vehicular impact into an on-road road restraint system is extremely large in terms of speed, approach angle, vehicle type, vehicle performance, and other vehicle and road conditions. Consequently the actual on-road impacts which occur may vary considerably from the specific standard test conditions. However, adequate implementation of the standard should identify the characteristics, in a candidate safety road restraint system, that are likely to achieve maximum safety and reject those features which are unacceptable.

It is recommended that this standard is reviewed within a period of five years, or following the completion of a proposed set of impact validation tests.

1 Scope

This European Standard gives the definitions of the principal terms used for road vehicle restraint systems and pedestrian restraint systems in other parts of this standard. It also specifies the general provisions for test methods.

Informative annexes B and C give information on impact kinetic energy and vehicle acceleration.

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 1317-2, *Road restraint systems —*

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

prEN 1317-3, *Road restraint systems —*

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

3 Abbreviations

ASI: Acceleration severity index

THIV: Theoretical head impact velocity

PHD: Post-impact head deceleration

OIV: Occupant impact velocity

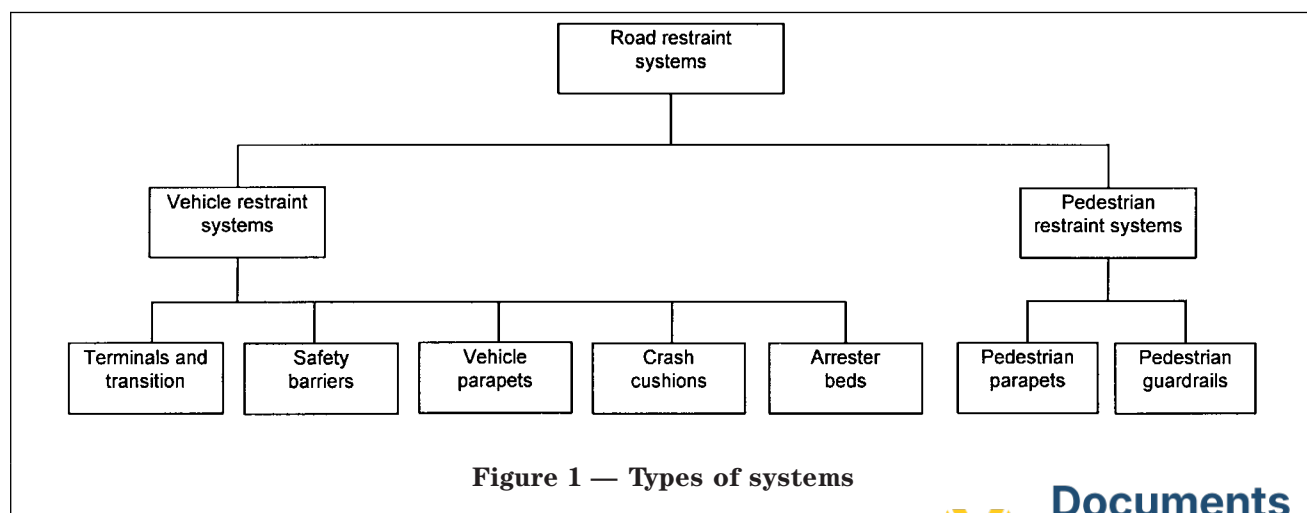
ORA: Occupant ridedown acceleration

VCDI: Vehicle cockpit deformation index

VIDI: Vehicle interior deformation index

4 Road restraint system terminology

The types of systems are shown in Figure 1.



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

4.1

road restraint system

general name for 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

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

4.4

permanent safety barrier

safety barrier installed permanently on the road

4.5

temporary safety barrier

safety barrier which is readily removable and used at road works, emergencies or similar situations

4.6

deformable safety barrier

safety barrier that deforms during a vehicle impact and may suffer permanent deformation

4.7

rigid safety barrier

safety barrier that has negligible deflection during a vehicle impact

4.8

single-sided safety barrier

safety barrier designed to be impacted on one side only

4.9

double-sided safety barrier

safety barrier designed to be impacted on both sides

4.10

terminal

the end treatment of a safety barrier

4.11

leading terminal

terminal placed at the upstream end of a safety barrier

4.12

trailing terminal

terminal placed at the downstream end of a safety barrier

4.13

transition

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

4.14

vehicle parapet

safety barrier installed on the edge of a bridge or on a retaining wall or similar structure where there is a vertical drop, and which may include additional protection and restraint for pedestrians and other road users

4.15

crash cushion

road vehicle energy absorption device installed in front of a rigid object to reduce the severity of impact

4.16

redirective crash cushion

crash cushion designed to contain and redirect an impacting vehicle

4.17

non-redirective crash cushion

crash cushion designed to contain and capture an impacting vehicle

4.18

arrester bed

area of land adjacent to the road filled with a particular material to decelerate and arrest errant vehicles

4.19

pedestrian restraint system

system installed to restrain and to provide guidance for pedestrians

4.20

pedestrian parapet

pedestrian or “other users” restraint system along a bridge or on top of a retaining wall or similar structure which is not intended to act as a road vehicle restraint system

4.21

pedestrian guardrail

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” includes provision for equestrians, cyclists and cattle.

5 Vehicle specifications under test conditions

Vehicle specifications under test conditions are specified in Table 1.

Table 1 — Vehicle specifications

Mass								
kg								
Vehicle mass (1)	825 ± 40	1 300 ± 65	1 500 ± 75	10 000 ± 300	13 000 ± 400	16 000 ± 500	30 000 ± 900	38 000 ± 1 100
Including maximum ballast (2)	100	160	180	—	—	—	—	—
Dummy	75	—	—	—	—	—	—	—
Total test mass	900 ± 40	1 300 ± 65	1 500 ± 75	10 000 ± 300	13 000 ± 400	16 000 ± 500	30 000 ± 900	38 000 ± 1 100
Dimensions								
m								
(limit deviation ±15%)								
Wheel track (front and rear)	1,35	1,40	1,50	2,00	2,00	2,00	2,00	2,00
Wheel radius (unloaded)	—	—	—	0,46	0,52	0,52	0,55	0,55
Wheel base (between extreme axles)	—	—	—	4,60	6,50	5,90	6,70	11,25
Number of axles	1S + 1 (3)	1S + 1	1S + 1	1S + 1	1S + 1	1S + 1/2	2S + 2	1S + 3/4
Ground clearance of the front bumper measured at the corner	—	—	—	0,58	—	0,58	0,58	0,58
Centre of gravity location								
m								
(limit deviation ±10 %)								
Longitudinal distance (4) from front axle (CGX) ±10 %	0,90	1,10	1,24	2,70	3,80	3,10	4,14	6,20
Lateral distance from vehicle centre line (CGY)	±0,07	±0,07	±0,08	±0,10	±0,10	±0,10	±0,10	±0,10
Height above ground (CGZ):								
Vehicle mass (±10 %)	0,49	0,53	0,53	—	—	—	—	—
Load (+15 % –5 %)	—	—	—	1,50	1,40	1,60	1,90	1,90
Type of vehicle	Car	Car	Car	Rigid HGV	Bus	Rigid HGV	Rigid	Articulated HGV
(1) Including load for heavy goods vehicles (HGV). (2) Including measuring and recording equipment. (3) S: steering axle. (4) Vehicle mass.								