

# Teknisk specifikation

## SIS-CEN/TS 1317-8:2012

Publicerad/Published: 2012-04-26  
Utgåva/Edition: 1  
Språk/Language: engelska/English  
ICS: 13.200; 93.080.30

---

### **Vägutrustning – Skyddsanordningar – Del 8: Skyddsanordningar som reducerar allvarligheten när motorcyklister kolliderar med skyddsräcken**

### **Road restraint systems – Part 8: Motorcycle road restraint systems which reduce the impact severity of motorcyclist collisions with safety barriers**

This preview is downloaded from [www.sis.se](http://www.sis.se). Buy the entire standard via <https://www.sis.se/std-86152>

# Standarder får världen att fungera

*SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.*

## Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

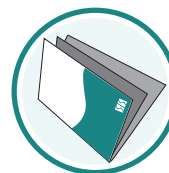
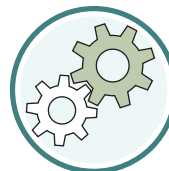
## Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

## Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

**Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på [www.sis.se](http://www.sis.se) eller ta kontakt med oss på tel 08-555 523 00.**



# Standards make the world go round

*SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.*

## Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

## Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

## Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

**If you want to know more about SIS, or how standards can streamline your organisation, please visit [www.sis.se](http://www.sis.se) or contact us on phone +46 (0)8-555 523 00**



Denna tekniska specifikation är inte en svensk standard. Detta dokument innehåller den engelska språkversionen av CEN/TS 1317-8:2012.

This Technical Specification is not a Swedish Standard. This document contains the English version of CEN/TS 1317-8:2012.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

*Uppllysningar om sakinnehållet i detta dokument lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna uppllysningar om nationell och internationell standard.*

*Information about the content of this document is available from the SIS, Swedish Standards Institute, telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about national and international standards.*

Dokumentet är framtaget av kommittén för Vägutrustning, SIS/TK 248.

Har du synpunkter på innehållet i det här dokumentet, vill du delta i ett kommande revideringsarbete eller vara med och ta fram standarder inom området? Gå in på [www.sis.se](http://www.sis.se) - där hittar du mer information.



TECHNICAL SPECIFICATION  
SPÉCIFICATION TECHNIQUE  
TECHNISCHE SPEZIFIKATION

**CEN/TS 1317-8**

April 2012

ICS 13.200; 93.080.30

English Version

**Road restraint systems - Part 8: Motorcycle road restraint systems which reduce the impact severity of motorcyclist collisions with safety barriers**

Dispositifs de retenue routiers - Partie 8 : Dispositifs de retenue routiers pour motos réduisant la sévérité de choc en cas de collision de motocyclistes avec les barrières de sécurité

Rückhaltesysteme an Straßen - Teil 8: Rückhaltesysteme für Motorräder, die die Anprallheftigkeit an Schutzplanken für Motorradfahrer reduzieren

This Technical Specification (CEN/TS) was approved by CEN on 7 February 2012 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

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, Turkey and United Kingdom.



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

**Management Centre: Avenue Marnix 17, B-1000 Brussels**

<b>Contents</b>	<b>Page</b>
Foreword .....	3
Introduction .....	4
<b>1 Scope .....</b>	<b>5</b>
<b>2 Normative references .....</b>	<b>5</b>
<b>3 Terms and definitions .....</b>	<b>5</b>
<b>4 Abbreviations .....</b>	<b>6</b>
<b>5 Biomechanical indices for assessing the impact severity of a PTW rider against an MPS .....</b>	<b>7</b>
5.1 General .....	7
5.2 Index representing the head injury risk: Head injury criterion ( $HIC_{36}$ ) .....	7
5.3 Indices representing neck injury risk .....	7
<b>6 Test methods .....</b>	<b>9</b>
6.1 General .....	9
6.2 Test site .....	9
6.3 Propulsion system .....	9
6.4 ATD and instrumentation .....	9
6.5 ATD clothing and equipment .....	10
6.6 ATD mass including equipment .....	10
6.7 Installation .....	10
6.8 Impact conditions .....	11
6.9 Launch configurations .....	11
6.10 Accuracies and deviation of impact speeds and angles .....	14
6.11 Photographic coverage .....	15
<b>7 Performance classes .....</b>	<b>16</b>
7.1 General .....	16
7.2 Speed classes .....	17
7.3 Severity levels .....	17
7.4 Deformation of the CMPS .....	21
<b>8 Acceptance criteria of the impact test .....</b>	<b>22</b>
8.1 MPS behaviour .....	22
8.2 ATD behaviour .....	22
8.3 Severity indices .....	24
8.4 Vehicle impact performance .....	24
<b>9 Test report .....</b>	<b>24</b>
<b>Annex A (informative) Detailed test report template .....</b>	<b>25</b>
<b>Annex B (informative) Anthropomorphic test device .....</b>	<b>30</b>
<b>Annex C (informative) Helmet alignment tool .....</b>	<b>32</b>
<b>Annex D (informative) Modification of the anthropomorphic test device shoulder .....</b>	<b>34</b>
<b>Annex E (informative) Reference helmet .....</b>	<b>40</b>
<b>Annex F (informative) Helmet calibration procedure .....</b>	<b>41</b>
F.1 General .....	41
F.2 Helmet description .....	41
F.3 Procedure description and layout .....	41
F.4 Helmet assessment .....	42
<b>Bibliography .....</b>	<b>44</b>

## Foreword

This document (CEN/TS 1317-8:2012) has been prepared by Technical Committee CEN/TC 226 “Road equipment”, the secretariat of which is held by AFNOR.

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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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* <sup>1)</sup>;
- EN 1317-5, *Road restraint systems — Part 5: Product requirements and evaluation of conformity for vehicle restraint systems*;
- CEN/TR 1317-6, *Road restraint systems — Part 6: Pedestrian restraint systems — Pedestrian parapets* <sup>2)</sup>;
- prEN 1317-7, *Road restraint systems — Part 7: Performance classes, impact test acceptance criteria and test methods for terminals of safety barriers*;
- CEN/TS 1317-8, *Road restraint systems — Part 8: Motorcycle road restraint systems which reduce the impact severity of motorcyclist collisions with safety barriers*.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: 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, Turkey and the United Kingdom.

---

1) ENV 1317-4:2001 will be superseded by future EN 1317-4, *Road restraint systems — Part 4: Performance classes, impact test acceptance criteria and test methods for transitions of safety barriers* (under preparation).

2) Under preparation.

## Introduction

In order to improve safety, the design of roads may require the installation of road restraint systems, which are intended to contain and redirect errant vehicles safely for the benefit of the occupants and other road users, or pedestrian parapets designed to restrain and to guide pedestrians and other road users not using vehicles, on sections of road and at particular locations defined by the national or local authorities.

EN 1317-2 contains performance classes, impact test acceptance criteria and test methods for barriers. Whereas EN 1317-1 covers the performance of these systems with respect to cars and heavy vehicles, this Technical Specification addresses the safety of the riders of powered two-wheeled vehicles impacting the barrier having fallen from their vehicle.

As powered two-wheeler riders may impact a barrier directly (in which case no protection is offered by the vehicle), special attention is given to these vulnerable road-users. In order to minimise the consequences to a rider of such an impact, it may be necessary to fit a barrier with a specific PTW rider protection system. Alternatively, a barrier might specifically incorporate characteristics limiting the consequences of a PTW rider impact.

Rider protection systems may be continuous (including barriers specifically designed with the safety of PTW riders in mind) or discontinuous. A discontinuous system is one which offers rider protection in specific localised areas of a barrier judged to be of higher risk. The most common example of a discontinuous system is one fitted locally to the posts of a post and rail type guardrail - adding nothing between the posts.

The purpose of this Technical Specification is to define the terminology specific to it, to describe procedures for the initial type-testing of rider protection systems and to provide performance classes and acceptance criteria for them.

Accident statistics from several European countries have shown that riders are injured when impacting barriers either whilst still on their vehicles or having fallen and then sliding along the road surface. Whilst different statistical sources show one or the other of these configurations to be predominant, all known studies show both to constitute a major proportion of rider to barrier impact accidents. Some studies showing the sliding configuration to be predominant have led to the development and use of test procedures in some European countries, evaluating systems with respect to the sliding configuration. At the time of writing, a number of such protection systems were already on the European market. It is for this reason that it was decided to address the issue of sliding riders initially, in order to bring about the adoption of a European Standard in as timely a manner as possible. However, the rider on vehicle configuration should also be considered as soon as possible as a subsequent addition.

This Technical Specification shall be read in conjunction with EN 1317-1 and EN 1317-2.



## 1 Scope

This Technical Specification specifies requirements for the impact performance of systems designed for the reduction of impact severity for PTW riders impacting safety barriers whilst sliding along the ground, having fallen from their PTW vehicle. The protection systems concerned are those fitted to barriers or barriers that have an inherent PTW rider protection or risk reduction capability. This Technical Specification excludes the assessment of the vehicle restraint capabilities of barriers and the risk that they represent to the occupants of impacting cars. The assessment of performance of impacting vehicles is covered by EN 1317-1 and EN 1317-2.

This Technical Specification defines performance classes taking into account rider speed classes, impact severity and the working width of the system with respect to rider impacts.

For systems designed to be added to a standard barrier, the test results are valid only when the system is fitted to the model of barrier used in the tests since the performance will not necessarily be the same if the system is fitted to a different barrier.

## 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, *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 1621-1, *Motorcyclists' protective clothing against mechanical impact — Part 1: Requirements and test methods for impact protectors*

EN ISO 4762, *Hexagon socket head cap screws (ISO 4762)*

ISO 6487, *Road vehicles — Measurement techniques in impact tests — Instrumentation*

## 3 Terms and definitions

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

### 3.1

#### **biomechanical indices**

indices obtained from the registers measured in the ATD, which are used to evaluate the severity of the impact

### 3.2

#### **clothing**

see 6.5.2

### 3.3

#### **continuous motorcyclist protection system**

any MPS placed continuously along a barrier with the purpose of retaining and redirecting an impacting rider, usually preventing direct impact with aggressive elements of the barrier such as posts, anchorages or module connections, and that also prevents a sliding rider from passing between the posts of a barrier and coming into contact with any potential hazard that may be behind the barrier

### 3.4

#### **discontinuous motorcyclist protection system**

any MPS placed locally around a potentially aggressive element of a barrier, such as a post, anchorage or module connection, with the purpose of reducing the severity of a direct impact of the rider against it

Note 1 to entry: This type of system is not intended to contain fallen PTW riders since the system is not present continuously along the length of the barrier

### 3.5

#### **dummy working width**

$W_d$

distance between the foremost part of the un-deformed system and the maximum dynamic lateral position of any part of the system or ATD

Note 1 to entry: see 7.4.

### 3.6

#### **impact severity**

risk level of physical injury to a rider resulting from an impact

### 3.7

#### **integrated motorcyclist protection system**

motorcyclist protection system, either continuous or discontinuous, which forms an integral part of a barrier design rather than being a separate add-on fitted to an existing barrier

### 3.8

#### **helmet**

see 6.5.1

### 3.9

#### **motorcyclist**

rider of any powered two-wheeler

### 3.10

#### **motorcyclist protection system**

any device installed on a barrier or in its immediate surroundings, the purpose of which is to reduce the severity of a PTW rider impact against the barrier

## 4 Abbreviations

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

CMPS	Continuous Motorcyclist Protection System
DMPS	Discontinuous Motorcyclist Protection System
MPS	Motorcyclist Protection System
PTW	Powered Two-Wheeler
$W_d$	Dummy working width

## 5 Biomechanical indices for assessing the impact severity of a PTW rider against an MPS

### 5.1 General

In order to assess the severity and define the acceptance criteria, the following biomechanical indices shall be used.

The sign convention shown in Figure 1, according to SAE J1733, shall be adopted.

### 5.2 Index representing the head injury risk: Head injury criterion ( $HIC_{36}$ )

The Head Injury Criterion ( $HIC_{36}$ ) is an acceleration-based criterion defined by Formula (1):

$$HIC = \max \left[ \frac{1}{t_2 - t_1} \times \int_{t_1}^{t_2} a \times dt \right]^{2,5} \times (t_2 - t_1) \quad (1)$$

where

$a$  is the resultant acceleration at the centre of gravity of the head expressed as units of gravity (1 g = 9,81 m/s<sup>2</sup>)

$$a = \sqrt{a_x^2 + a_y^2 + a_z^2} \quad (2)$$

$a_x$  is the acceleration X-axis;

$a_y$  is the acceleration Y-axis;

$a_z$  is the acceleration Z-axis.

The ( $HIC_{36}$ ) values for calculation intervals ( $t_2 - t_1$ ) greater than 36 are not taken into account for the calculation of maximum values, i.e., ( $t_2 - t_1$ ) ≤ 36 ms.

### 5.3 Indices representing neck injury risk

The indices representing neck injury risk are

- anterior-posterior shear force ( $F_x$ ),
- lateral shear force ( $F_y$ ),
- tension-compression force ( $F_z$ ),
- lateral bending moment calculated about the occipital condyle ( $M_{ocx}$ ),
- flexion/extension moment calculated about the occipital condyle ( $M_{ocy}$ ),
- torsion moment ( $M_z$ ).

The above indices shall be determined using the “upper neck load cell”.