

SVENSK STANDARD

SS-EN 16303:2020

Vägutrustning – Validerings- och verifieringsprocess för användning av virtuell provning vid kollisionsprovning av skyddsanordningar

Road restraint systems – Validation and verification process for the use of virtual testing in crash testing against vehicle restraint system



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EUROPEAN STANDARD

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English Version

Road restraint systems - Validation and verification process for the use of virtual testing in crash testing against vehicle restraint system

Dispositifs de retenue routiers - Processus de vérification et de validation pour l'utilisation d'essais virtuels dans les essais de choc contre un dispositif de retenue pour véhicules

Rückhaltesysteme an Straßen - Validierungs- und Nachweisverfahren für die Nutzung von Computersimulationen bei Anprallprüfungen an Fahrzeug-Rückhaltesysteme

This European Standard was approved by CEN on 24 May 2020.

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SS-EN 16303:2020 (E)

Contents		Page
European foreword.....		5
Introduction		6
1	Scope	7
2	Normative references.....	7
3	Terms and definitions	7
4	Symbols and abbreviations	8
5	Requirements for numerical vehicle model.....	9
5.1	Modelling.....	9
5.2	General vehicle model behaviour assessment	10
5.3	Test methodology.....	10
5.4	Verification.....	13
5.5	Reporting	13
6	Requirements for numerical model of vehicle restraint system.....	13
6.1	Modelling.....	13
6.2	Validation and verification	14
6.3	Reporting	14
7	Requirements for numerical model of passive safety device	14
7.1	Modelling.....	14
7.2	Validation and verification	14
7.3	Reporting	14
8	Requirements for validation of virtual testing against test item.....	14
8.1	General.....	14
8.2	Test specifications	15
8.3	Comparison tables	17
8.4	Reporting	22
9	Requirements for verification of virtual testing against vehicle restraint systems and passive safety devices.....	23
9.1	General.....	23
9.2	Finite element model verification.....	23
9.3	Multi-body model verification.....	23
9.4	Standard report and output parameters.....	24
Annex A (normative) Virtual testing – Template for report.....		25
A.1	General.....	25
A.2	Verification and validation report.....	25
A.3	New performance report.....	34
Annex B (normative) Requirements for the entity (person/group) performing and verifying VT activities.....		42
Annex C (normative) Validation procedures of a vehicle for crash test analysis		44
C.1	General.....	44
C.2	Vehicle setup – Idle test (Test 1.1)	44

C.3	Vehicle suspension and steering kinematics.....	44
C.4	Vehicle handling.....	46
C.5	Vehicle crashworthiness - Test against rigidwall / rigid pole (Test 4.1 and 4.2).....	46
	Annex D (informative) Considerations on the modelling techniques of a vehicle.....	47
D.1	General	47
D.2	General scheme of a vehicle.....	47
D.3	Vehicle validation considerations	48
D.4	Step by step development of a vehicle for crash test analysis.....	49
	Annex E (informative) Recommendations and criteria for finite element vehicle models addressed to virtual testing.....	50
E.1	Components to be modelled	50
E.2	Model organization	53
E.3	General recommendations for the material of finite element vehicle models addressed to virtual testing.....	56
E.4	General recommendations for the mesh of finite element vehicle models addressed to virtual testing.....	57
	Annex F (informative) Recommendations and criteria for multi-body vehicle models addressed to virtual testing.....	61
F.1	Multi-body models	61
F.2	General requirements.....	61
F.3	Modelling requirements	61
F.4	Model organization	62
F.5	General recommendations for the material of multi-body-element vehicle models addressed to virtual crash test	74
	Annex G (informative) Considerations on the modelling techniques of a vehicle restraint system.....	75
G.1	General	75
G.2	Finite element and multi-body approaches	75
G.3	Finite element guidelines	76
G.4	Multi-body guidelines	76
G.5	Step by step development of a vehicle restraint system	76
G.6	Verification of the model	78
	Annex H (informative) Recommendations and criteria for finite element vehicle restraint system models addressed to virtual testing	80
H.1	Material recommendations for finite element vehicle restraint system models addressed to virtual testing.....	80
H.2	General recommendations for the mesh of finite element vehicle restraint system models addressed to virtual testing	80
H.3	2D-mesh specifications.....	80

SS-EN 16303:2020 (E)

H.4	Welding and connections	81
H.5	3D-mesh specifications – Mesh features.....	81
Annex I (informative) Recommendations and criteria for multi-body vehicle restraint system models addressed to virtual crash testing.....		82
I.1	Introduction.....	82
I.2	Welding and connections	82
I.3	Model validation.....	82
Annex J (informative) Failure modes.....		83
Bibliography		85

European foreword

This document (EN 16303:2020) 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 February 2021, and conflicting national standards shall be withdrawn at the latest by February 2021.

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

This document supersedes CEN/TR 16303-1:2012, CEN/TR 16303-2:2012, CEN/TR 16303-3:2012 and CEN/TR 16303-4:2012 (which have been merged).

In comparison to the previous Technical Reports, this document contains the following changes:

- some symbols and abbreviations have been modified;
- the roadmap for the validation of the numerical vehicle model has been updated and acceptance conditions have been provided;
- the validation requirements for virtual testing against vehicle restraint systems have been updated;
- the verification evaluation criteria for finite element model have been updated;
- the template of the report has been updated.

Annexes A, B and C are normative and Annexes D to J are informative.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

SS-EN 16303:2020 (E)

Introduction

This document provides a common basis for the use of virtual testing to reproduce vehicle impacts against vehicle restraint systems including safety barriers, crash cushions, terminals and passive safety devices in accordance with the EN 1317 (all parts) and the EN 12767:2019.

This document provides requirements to establish the degree to which the numerical models of vehicle restraint system and of vehicle are an accurate representation of the real world from the perspective of the intended uses of the model.

In this document a methodology is defined to validate the results obtained with computational mechanics work and to verify the reliability of the virtual test. It also includes a report template and incorporates specific content for general requirements for the competence of entities performing virtual testing.

General recommendations based on experiences for developing numerical models of vehicle restraint systems and vehicles for virtual tests are also given.

Two main modelling approaches have been considered:

- finite element (FE) method;
- multi-body (MB) approach.

1 Scope¹

This document defines the accuracy, credibility and confidence in the results of virtual crash test to vehicle restraint systems through the definition of procedures for verification, validation and development of numerical models for roadside safety application. Finally it defines a list of indications to ensure the competences of an expert/organization in the domain of virtual testing.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1317-1:2010, *Road restraint systems - Part 1: Terminology and general criteria for test methods*

EN 1317-2:2010, *Road restraint systems - Part 2: Performance classes, impact test acceptance criteria and test methods for safety barriers including vehicle parapets*

EN 1317-3:2010, *Road restraint systems - Part 3: Performance classes, impact test acceptance criteria and test methods for crash cushions*

ENV 1317-4:2001, *Road restraint systems – Part 4: Performance classes, impact test acceptance criteria and test methods for terminals and transitions of safety barriers*

EN 12767:2019, *Passive safety of support structures for road equipment - Requirements and test methods*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp/ui>

3.1

independent expert

third-party qualified expert in virtual testing with experience on vehicle restraint systems and/or passive safety devices, independent from the organisation or the construction product he assesses (see Annex B)

3.2

numerical model

complete mathematical 3-D model of vehicle restraint systems, passive safety devices and vehicles

Note 1 to entry: It refers to a numerical model which might be analytical or discrete and aims to reproduce the basic physical phenomena of a subject.

3.3

passive safety device

support structures for road equipment tested according to EN 12767:2019

¹ The scope of this document is also applicable to passive safety devices.