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I.S. EN 15227:2008+A1:2010

Railway applications - Crashworthiness requirements for railway vehicle bodies

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English Version

Railway applications - Crashworthiness requirements for railway vehicle bodies

Applications ferroviaires - Exigences en sécurité passive
contre collision pour les structures de caisses des
véhicules ferroviaires

Bahnanwendungen - Anforderungen an die
Kollisionssicherheit von Schienenfahrzeugkästen

This European Standard was approved by CEN on 12 December 2007 and includes Amendment 1 approved by CEN on 28 September 2010.

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Foreword

This document (EN 15227:2008+A1:2010) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by May 2011 and conflicting national standards shall be withdrawn at the latest by May 2011.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 includes Amendment 1, approved by CEN on 2010-09-28.

This document supersedes EN 15227:2008.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** and **A1**.

A1 This document has been prepared under a mandate given to CEN/CENELEC/ETSI by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document. **A1**

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 United Kingdom.

Introduction

The objective of the passive safety requirements described in this European Standard is to reduce the consequences of collision accidents. The measures considered in this European Standard provide the last means of protection when all possibilities of preventing an accident have failed. It provides a framework for determining the crash conditions that railway vehicle bodies should be designed to withstand based on the most common accidents and associated risks.

The requirements are compatible with those of EN 12663. The static compression load requirements on the vehicle ends, required by EN 12663, are intended to provide a basic structural integrity to the occupied areas in a collision-type accident. This European Standard adds to the basic strength requirement by setting additional requirements for structural passive safety in order to increase occupant safety.

1 Scope

This European Standard applies to new designs of locomotives and passenger carrying rolling stock as defined in categories C-I to C-IV of Clause 4 taking into consideration the recommendations given in Annex E on the application of the standard (migration rule). It is intended to protect vehicle occupants, through the preservation of structural integrity, and does not extend to other railway employees and customers who are not in vehicles, or to third parties. The specified requirements relate to the technical and operational conditions of use that prevail in the CEN member countries. The design of new vehicles for use in passenger trains is based on operations with compatible rolling stock that also meet this standard. It is recognised that operational requirements will require new crashworthy and existing non-crashworthy vehicles to exist in the same train unit but such combinations of vehicles are not required to comply with this European Standard.

The requirements apply to the vehicle body, and to those mechanical elements directly associated with it that may be used to absorb energy in a collision, such as couplers, buffing systems etc. They do not cover the safety features of doors, windows, system components or interior features except for specific issues relating to the preservation of survival space.

The requirements do not cover all possible accident scenarios but provide a level of crashworthiness that will reduce the consequences of an accident, when the active safety measures have been inadequate. The requirement is to provide a level of protection by addressing the most common types of collision that cause injuries and fatalities.

The applicable design collision scenarios, and suitable parameters for normal European operations, are given in Clause 5. Annex A gives additional information regarding the derivation of the scenarios and describes situations when they may need to be modified and the processes that should then be followed.

This European Standard identifies common methods of providing passive safety that may be adopted to suit individual vehicle requirements. This European Standard also specifies the characteristics of reference obstacle models for use in the design collision scenarios. Not all vehicles in a train unit have to incorporate energy absorption provided that passenger train configurations formed entirely of new vehicle designs comply as a whole with this European Standard.

This European Standard also specifies the requirements for demonstrating that the passive safety objectives have been achieved by comparison with existing proven designs, numerical simulation, component or full-size tests, or a combination of all these methods.

2 Normative references

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

EN 12663, *Railway applications — Structural requirements of railway vehicle bodies*

3 Terms and definitions

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

3.1

active safety

systems and measures which take actions that aim to prevent a collision occurring

3.2

broadly acceptable risk

level of risk that is regarded as not significant in the context in which it is experienced

3.3

collision mass

is taken as the design mass in working order plus the mass of 50 % of seated passengers

3.4

crashworthiness

ability to mitigate the consequences of a collision in a controlled manner and reduce the risk of injury to the occupants

3.5

crumple zone

part of the vehicle body (usually at the vehicle ends) which is designed to deform in a controlled manner and absorb energy

3.6

crushing

excessive plastic deformation that significantly reduces the volume created by the vehicle structure

3.7

design collision scenario (= limiting collision scenario/case)

most severe collision/case for each given scenario that it is appropriate to protect against and so is applicable for design purposes on the basis of the collision accident analysis; see [1], [5]

3.8

driving trailer

non-powered vehicle fitted with a driving cab and which is designed to operate in general traffic and not as part of a fixed configuration train unit

3.9

energy absorbing device

device which is attached to, but not part of the vehicle structure and is designed to deform in a controlled manner and absorb energy (e.g. energy absorbing coupler)

3.10

fixed seat

permanent seat in the cab that is occupied during normal operation (e.g. cannot be folded away when not in use)

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