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Railway applications - Aerodynamics - Part 6: Requirements and test procedures for cross wind assessment

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Bahnanwendungen - Aerodynamik - Teil 6: Anforderungen und Prüfverfahren für die Bewertung von Seitenwind

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 14067-6:2010) 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of an identical text or by endorsement, at the latest by July 2010, and conflicting national standards shall be withdrawn at the latest by July 2010.

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, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

This European Standard is part of the series "Railway applications – Aerodynamics" which consists of the following parts:

— Part 1: Symbols and units

— Part 2: Aerodynamics on open track

— Part 3: Aerodynamics in tunnels

— Part 4: Requirements and test procedures for aerodynamics on open track

— Part 5: Requirements and test procedures for aerodynamics in tunnels

— Part 6: Requirements and test procedures for cross wind assessment

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

Trains running on open track are exposed to cross winds. The cross wind safety of railway operations depends on vehicle and infrastructure characteristics and operational conditions. Important parameters are:

— aerodynamic characteristics of the vehicle;

— vehicle dynamics (e.g. mass, suspension, bump stops);

— track gauge;

— line characteristics (radius and cant of the track, height of embankments and bridges, walls near the track);

— wind exposure of the line;

— operating speed, mode of operation (conventional, tilting, running direction).

1 Scope

This European Standard applies to the cross wind assessment of railways taking into consideration the recommendations given in Annex M on the application of the standard (migration rule). The methods presented have been applied to passenger vehicles with a maximum speed up to 360 km/h and to freight vehicles with a maximum speed up to 160 km/h. This European Standard applies to coaches, multiple units, freight wagons, locomotives and power cars.

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 14067-1:2003, *Railway applications — Aerodynamics — Part 1: Symbols and units*

EN 14067-2, *Railway applications — Aerodynamics — Part 2: Aerodynamics on open track*

EN 14363, *Railway applications — Testing for the acceptance of running characteristics of railway vehicles — Testing of running behaviour and stationary tests*

EN 15663, *Railway applications — Definition of vehicle reference masses*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14067-1:2003 and the following apply.

3.1
lee rail
rail on the lee side of the track

3.2
bias
systematic error affecting an estimate

NOTE In this document, it is expressed as the ratio of a coefficient obtained during benchmark wind tunnel tests to the equivalent coefficient obtained during new wind tunnel tests.

4 Symbols and abbreviations

For the purposes of this document, the symbols given in EN 14067-1:2003 and the following apply.

Table 1 — Symbols

Symbol	Unit	Significance	Explanation or remark
$\widetilde{A}$	-	Normalized gust amplitude	
a_{m}	s/m	Dispersion	Dispersion determined by extreme value analysis of wind tunnel data