Raudteealased rakendused. Aerodünaamika. Osa 5: Nõuded aerodünaamikale tunnelites ning selle katsetamise protseduurid KONSOLIDEERITUD TEXT

Railway applications - Aerodynamics - Part 5: Requirements and test procedures for aerodynamics in tunnels CONSOLIDATED TEXT

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 14067-5:2006+A1:2010 sisaldab Euroopa standardi EN 14067-5:2006+A1:2010 ingliskeelset teksti.	This Estonian standard EVS-EN 14067-5:2006+A1:2010 consists of the English text of the European standard EN 14067-5:2006+A1:2010.
Standard on kinnitatud Eesti Standardikeskuse 31.12.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 31.12.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 03.11.2010.	Date of Availability of the European standard text 03.11.2010.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 45.060.01, 93.060

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 14067-5:2006+A1

November 2010

ICS 45.060.01; 93.060

Supersedes EN 14067-5:2006

English Version

Railway applications - Aerodynamics - Part 5: Requirements and test procedures for aerodynamics in tunnels

Applications ferroviaires - Aérodynamique - Partie 5: Exigences et procédures d'essai pour l'aérodynamique en tunnel

Bahnanwendungen - Aerodynamik - Teil 5: Anforderungen und Prüfverfahren für Aerodynamik im Tunnel

This European Standard was approved by CEN on 30 June 2006 and includes Amendment 1 approved by CEN on 28 September 2010.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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 and United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword

This document (EN 14067-5:2006+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 14067-5:2006.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟦A1⟩ ⟨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⟧

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: Cross wind effects on railway operation*

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.

1 Scope

This European Standard applies to the aerodynamic loading caused by trains running in a tunnel.

2 Normative references

The following referenced document is 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*

3 Terms, definitions, symbols and abbreviations

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

NOTE Additional definitions, symbols and abbreviations are explained in the text.

3.1
tunnel
closed structure enveloping track(s) with a length of more than 20 m

4 Methodologies for quantifying the pressure changes in order to meet the medical health criterion

4.1 General

The relevant pressure changes caused by trains running in a tunnel may be measured at full-scale, estimated from approximating equations (see Annex A), predicted using validated numerical methods or measured using moving model tests. The determination of the pressure variations in order to meet the medical safety pressure limits may be undertaken in the same way.

Full-scale test data may be the basis for train and tunnel acceptance and homologation.

Each single train/tunnel combination is described by a train-tunnel-pressure signature.

4.2 Train-tunnel-pressure signature

4.2.1 General

The static pressure in the tunnel as shown in Figure 1 develops as follows when a train enters the tunnel:

— there is a sharp first increase in pressure Δp_N caused by the entry of the nose of the train into the tunnel;

— there is a second increase in pressure Δp_{fr} due to friction effects caused by the entry of the main part of the train into the tunnel;

— there is then a drop in pressure Δp_T caused by the entry of the tail of the train in the tunnel;

— there is a sharp drop in pressure Δp_{HP} caused by the passing of the train head at the measurement position in the tunnel.