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

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EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN 14067-5:2006 sisaldab Euroopa standardi EN 14067-5:2006 ingliskeelset teksti. Käesolev dokument on jõustatud 20.09.2006 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 14067-5:2006 consists of the English text of the European standard EN 14067-5:2006. This document is endorsed on 20.09.2006 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

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

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

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Foreword

This document (EN 14067-5:2006) 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of an identical text or by endorsement, at the latest by February 2007, and conflicting national standards shall be withdrawn at the latest by February 2007.

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 96/48/EC as amended by Directive 2004/50/EC.

For relationship with EU Directive, 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: 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, 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.