



BSI Standards Publication

Road and airfield surface characteristics — Test methods

Part 5: Determination of longitudinal unevenness indices

National foreword

This British Standard is the UK implementation of EN 13036-5:2019.

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Méthodes d'essais - Partie 5 : Détermination des
indices d'uni longitudinal

Oberflächeneigenschaften von Straßen und
Flugplätzen - Prüfverfahren - Teil 5: Bestimmung der
Längsunebenheitindizes

This European Standard was approved by CEN on 21 July 2019.

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European foreword

This document (EN 13036-5:2019) has been prepared by Technical Committee CEN/TC 227 “Road materials”, 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of an identical text or by endorsement, at the latest by March 2020, and conflicting national standards shall be withdrawn at the latest by March 2020.

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Introduction

Through road/vehicle dynamic interaction and vehicle vibration, the road profile evenness affects safety (tyre contact forces), ride quality, energy consumption, vehicle wear as well as pavement and road durability. The road profile evenness is consequently key information for road maintenance-management-systems and performance control.

The purpose of this document is to provide a standard practice for calculating and reporting estimates of road evenness from digitized longitudinal profiles.

This practice covers the mathematical processing of longitudinal profile measurements to produce evenness statistics (indices) covering the wavelength range 0,5 m to 50 m. These wavelengths cover most situations for cars¹⁾. The practice describes the calculation procedure for the International Roughness Index (IRI), wave band analysis (Root Mean Square (RMS) and Longitudinal Profile Variance (LPV)) and the Weighted Longitudinal Profile (WLP).

The purpose of the practice is to ensure that when applying one of the possible procedures, exactly the same steps are carried out, with the aim of facilitating the comparison of evenness measurements carried out with different profiling instruments in European countries. The Wave band analysis procedures are informative and therefore IRI is preferred as benchmarking parameter.

NOTE As a control of the implementation of calculation of the evenness indices, three longitudinal profiles are available including the “true values”. They can be found at www.erpug.org in the directory *reference profiles*. More on this can be found in Annex F.

1) For higher speed, e.g. on airport runways or highways, longer wavelengths could also be important.

1 Scope

This document specifies the mathematical processing of digitized longitudinal profile measurements to produce evenness indices. The document describes the calculation procedure for the International Roughness Index (IRI), Root Mean Square (RMS) and Longitudinal Profile Variance (LPV) from three separate wavelength bands and the σ WLP and Δ WLP from the Weighted Longitudinal Profile (WLP).

The purpose of this document is to provide a standard practice for calculating and reporting estimates of road evenness from digitized longitudinal profiles. Other aims with this document are to facilitate the comparison of evenness measurement results carried out with different profiling instruments in European countries.

The evenness range covered in this document is defined as the wavelength range 0,5 m to 50 m. It is noted that both shorter and longer wavelengths can also influence the driving comfort but those are not covered in this document.

The quantified evenness indices derived from this document are useful support for pavement management systems. The output can also be used for type approval and performance control of new and old pavements. The indices can be used on rigid, flexible and gravel road surfaces.

This document doesn't define from what position on the road the longitudinal profile should be obtained.

The derived indices are portable in the sense that they can be obtained from longitudinal profiles measured with a variety of instruments.

2 Normative references

There are no normative references in this document.

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>

3.1

reporting repetition interval

measurements made over the road surface which are often analysed using shorter parts or samples to allow for a more precise description of the measured profile and which is the length of such a sample

Note 1 to entry: For more information on samples see key 4, l_0 to l_n in Figure 1