Road and airfield surface characteristics - Test methods - Part 8: Determination of transverse unevenness and crossfall indices

EESTI STANDARDIMIS- JA AKREDITEERIMISKESKUS
ESTONIAN CENTRE FOR STANDARDISATION AND ACCREDITATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 13036-8:2025 sisaldab Euroopa standardi EN 13036-8:2025 ingliskeelset teksti.	This Estonian standard EVS-EN 13036-8:2025 consists of the English text of the European standard EN 13036-8:2025.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 09.07.2025.	Date of Availability of the European standard is 09.07.2025.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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EUROPEAN STANDARD

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English Version

Road and airfield surface characteristics - Test methods - Part 8: Determination of transverse unevenness and crossfall indices

Caractéristiques de surface des routes et aérodromes - Méthodes d'essais - Partie 8 : Détermination des indices d'uni transversal et de dévers

Oberflächeneigenschaften von Straßen und Flugplätzen - Prüfverfahren - Teil 8: Bestimmung von Indizes für die Querunebenheit und die Querneigung

This European Standard was approved by CEN on 9 June 2025.

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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-CENELEC Management Centre has the same status as the official versions.

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

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European foreword

This document (EN 13036-8:2025) has been prepared by Technical Committee CEN/TC 227 “Road materials”, the secretariat of which is held by BSI- British Standards Institution.

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 January 2026, and conflicting national standards shall be withdrawn at the latest by January 2026.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document will supersede EN 13036-8:2008.

EN 13036-8:2025 includes the following significant technical changes with respect to EN 13036-8:2008:

— the title of the document has changed from *Determination of transverse unevenness* to *Determination of transverse unevenness and crossfall indices*;

— routines for pre-processing the transverse profile before calculating the indices;

— the standard includes procedures to calculate transversal unevenness for profilometers with a densely collected transverse profile;

— the standard contains more possibilities to characterize the transversal unevenness and crossfall. The calculation routines for all indices have been updated and better described:

  — two additional principles to describe the rut depth are added, sliding wire rut depth and total transverse unevenness;

  — one additional principle to describe crossfall is added, crossfall line;

  — the definition of Edge slump is updated;

  — distance between rut buttons is added;

  — rut width is added;

  — rut area is added;

  — water area is added;

— step height has been removed;

— a link to an implementation guide to calculate the indices has been added.

EN 13036 consists of the following parts, under the general title *Road and airfield surface characteristics — Test methods*:

— *Part 1: Measurement of pavement surface macrotexture depth using a volumetric patch technique*

— *Part 2: Assessment of the skid resistance of a road pavement surface by the use of dynamic measuring systems*[1]

— *Part 3: Measurement of pavement surface horizontal drainability*

— *Part 4: Method for measurement of slip/skid resistance of a surface: the pendulum test*

— *Part 5: Determination of longitudinal unevenness indices*

— *Part 6: Measurement of transverse and longitudinal profiles in the evenness and megatexture wavelength ranges*

— *Part 7: Irregularity measurement of pavement courses: the straightedge test*

— *Part 8: Determination of transverse unevenness and crossfall indices*

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

[1] Part 2 is available as a CEN/TS.

Introduction

Road surface unevenness and crossfall affects safety, ride comfort, environmental impact, and the technical performance of roads. When a road is in use the surface will be deformed and worn due to the traffic load. Contributing causes of surface degradation are the time in use, the traffic load, weather/climate conditions, geological conditions, used materials as well as the strength of the road construction. To simplify quantifying the degree of deformation and wear, indicators have been developed that are based on the transverse (perpendicular to the direction of traffic flow) and longitudinal (parallel to the direction of traffic flow) profiles. Rut depth is such an indicator of the technical performance of the surface course that arises from permanent deformation from traffic loads and wear from the tyre and pavement interaction. A road with a moderate level of rut depth in combination with a sufficient crossfall will lower or even eliminate the risk of aquaplaning in wet conditions and as far as rut depth is concerned, a low or moderate level will ensure sufficient lateral stability of vehicles with trailers (especially by a lane change). More than two wheel paths can occur due to wear from heavy traffic and cars since the transverse location of the wheels differs. This is most prominent in countries where studded tyres are used. The transverse unevenness encompasses aspects, such as: irregularities in the transverse profile including the longitudinal ruts and deformations in the wheel paths caused by the traffic. Measurement devices measuring the transverse profiles can be divided into two groups:

— slow or stationary equipment, such as the straightedge for irregularities and longitudinal ruts;

— equipment used at traffic speed, such as profilometers, which depending on the characteristics of the device, are suitable for measuring single sections as well as longer road sections and networks.

The quantified unevenness indices derived from this document are useful support for quality control of newly laid pavement surfaces, especially with respect to the evidence of irregularities due to improper laying and/or compacting actions. It is also useful for evaluating the condition of pavements in service as part of routine condition monitoring programs, and finally as indices to be used for maintenance planning of resurfacing activities on pavements in use. The derived indices are portable in the sense that they can be obtained from transverse profiles measured with any suitable instrument.

All indices described in this document are related to the actual lane and direction of the road at which the measurement is done.

1 Scope

This document specifies the mathematical processing of digitized transverse profile measurements to produce indices in the transverse direction for unevenness, other defects and crossfall. The document describes the calculation methods of the indices, such as irregularities, (1) rut depth, (2) ridge height, (3) water depth and area, (4) crossfall, and how to evaluate and report the indices. It also describes possibilities to do further analysis to examine defects and problems on the road that can be seen in the transverse profile. The latter is described in Annex E.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 13036-6, *Road and airfield surface characteristics - Test methods - Part 6: Measurement of transverse and longitudinal profiles in the evenness and megatexture wavelength ranges*

EN 13036-7, *Road and airfield surface characteristics - Test methods - Part 7: Irregularity measurement of pavement courses : the straightedge test*

ISO 3534-1, *Statistics — Vocabulary and symbols — Part 1: General statistical terms and terms used in probability*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp/

— IEC Electropedia: available at https://www.electropedia.org/

3.1
acquisition repetition interval
absolute value of the difference of abscissa between two longitudinal adjacent points of the digitised transverse profiles

Note 1 to entry: Low level, typical 0,1 m to 1 m, see Figure 1 for further information.

3.2
bias
difference between the expectation of the test result and an accepted reference value

Note 1 to entry: Bias is the total systematic error as contrasted to random error. There can be one or more systematic error components to the bias. A large systematic difference from the accepted reference value is reflected by a large bias value (see ISO 3534-1).