SLOVENSKI STANDARD
SIST-TS CEN/TS 15901-15:2014

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Značilnosti cestnih in letaliških površin - 15. del: Postopek določanja torne sposobnosti vozne površine z mehanizmom za kontroliran zdrs v vzdolžni smeri (LFCI): IMAG

Road and airfield surface characteristics - Part 15: Procedure for determining the skid resistance of a pavement surface using a device with longitudinal controlled slip (LFCI): The IMAG

Oberflächeneigenschaften von Straßen und Flugplätzen - Teil 15: Verfahren zur Bestimmung der Griffigkeit von Fahrbahndecken durch Verwendung eines Geräts mit geregeltem Schlupf in Längsrichtung (LFCE): Das IMAG-Gerät

Caractéristiques de surface des routes et aéroports - Partie 15: Mode opératoire de détermination de l'adhérence d'un revêtement de chaussée à l'aide d'un dispositif à glissement longitudinal contrôlé (CFLI): IMAG

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ICS:

17.040.20	Lastnosti površin	Properties of surfaces
93.080.10	Gradnja cest	Road construction
93.120	Gradnja letališč	Construction of airports

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ICS 93.080.20; 93.120

English Version

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This Technical Specification (CEN/TS) was approved by CEN on 1 March 2014 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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

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Foreword

This document (CEN/TS 15901-15:2014) has been prepared by Technical Committee CEN/TC 227 “Road materials”, the secretariat of which is held by DIN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. CEN [and/or] CENELEC shall not be held responsible for identifying any or all such patent rights.

CEN/TS 15901, *Road and airfield surface characteristics*, is composed with the following parts:

— *Part 1: Procedure for determining the skid resistance of a pavement surface using a device with longitudinal fixed slip ratio (LFCS): RoadSTAR*;

— *Part 2: Procedure for determining the skid resistance of a pavement surface using a device with longitudinal controlled slip (LFCRNL): ROAR (Road Analyser and Recorder of Norsemeter)*;

— *Part 3: Procedure for determining the skid resistance of a pavement surface using a device with longitudinal controlled slip (LFCA): The ADHERA*;

— *Part 4: Procedure for determining the skid resistance of pavements using a device with longitudinal controlled slip (LFCT): Tatra Runway Tester (TRT)*;

— *Part 5: Procedure for determining the skid resistance of a pavement surface using a device with longitudinal controlled slip (LFCRDK): ROAR (Road Analyser and Recorder of Norsemeter)*;

— *Part 6: Procedure for determining the skid resistance of a pavement surface by measurement of the sideway force coefficient (SFCS): SCRIM®*;

— *Part 7: Procedure for determining the skid resistance of a pavement surface using a device with longitudinal fixed slip ratio (LFCG): the GripTester®*;

— *Part 8: Procedure for determining the skid resistance of a pavement surface by measurement of the sideway-force coefficient (SFCD): SKM*;

— *Part 9: Procedure for determining the skid resistance of a pavement surface by measurement of the longitudinal friction coefficient (LFCD): DWWNL skid resistance trailer*;

— *Part 10: Procedure for determining the skid resistance of a pavement surface using a device with longitudinal block measurement (LFCSK): the Skiddometer BV-8*;

— *Part 11: Procedure for determining the skid resistance of a pavement surface using a device with longitudinal block measurement (LFCSR): the SRM*;

— *Part 12: Procedure for determining the skid resistance of a pavement surface using a device with longitudinal controlled slip: the BV 11 and Saab friction tester (SFT)*;

— *Part 13: Procedure for determining the skid resistance of a pavement surface by measurement of a sideway force coefficient (SFCO): the Odoliograph*;

— *Part 15: Procedure for determining the skid resistance of a pavement surface using a device with longitudinal controlled slip (LFCI): The IMAG* [the present document].

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus,

Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This Technical Specification describes a method only used on airports for determining the skid resistance of pavements by measurement of the longitudinal friction coefficient LFCI.

The method provides a measure of the wet skid resistance properties of a bound surface by measurement of the longitudinal friction coefficient using a trailer with a standard slip ratio of 15 %. The slip ratio can be chosen between 0 % and 100 % for research application.

The test tyre is dragged over a pre-wetted pavement under vertical force and constant speed conditions while the test tyre is parallel to the direction of motion.

This Technical Specification covers the operation of the IMAG device.

The skid resistance of a pavement is determined by friction measurements at different speeds. Tests can be performed between 40 km/h and 120 km/h but standard test speeds are 40 km/h, 65 km/h and 95 km/h. Low speed measurements asses the microtexture while high speed measurements asses the macrotexture. The skid resistance is reported as friction measurements at these speeds and by comparison with the minimum friction level.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

ASTM E670-09, *Standard Test Method for Side Force Friction on Paved Surfaces Using the Mu-Meter*

ASTM E2100-04, *Standard Practice for Calculating the International Runway Friction Index*

PIARC Technical Document. *Specification for a standard test tyre for friction coefficient measurement of a pavement surface: Smooth test tyre* (2004-03)

3 Recommended uses

The IMAG is used in the following fields of application:

— monitoring of airport pavements (Pavement Management) according to ICAO Annex 14 Attachment A 7,

— approval of new surfacing according to ICAO Annex 14 Attachment A 7,

— investigation of surface skid resistance,

— measurements on project-level compliance,

— comparative measurements among different devices,

— measurements on contaminated (ice or snow covered) airport pavements (not covered by this Technical Specification) according to ICAO Annex 14 Attachment A 6,

— research measurements.

4 Terms and definitions

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

4.1
contact area
overall area of the road surface instantaneously in contact with a tyre

Note 1 to entry: This term describes the overall area generally covered by the tyre. Due to the effects of surface texture or any tyre tread pattern, not all of the tyre or road surface in the contact area may be in contact at any instant.

4.2
friction
resistance to relative motion between two bodies in contact, the frictional force being the force which acts tangentially in the contact area

4.3
vertical force (load)
force applied by the wheel assembly on the contact area

Note 1 to entry: Some devices use an assumed load based on the static load.

4.4
horizontal force (drag)
horizontal force acting tangentially on the test wheel in line with the direction of travel

4.5
slip ratio
slip speed divided by the operating speed

4.6
longitudinal friction coefficient
LFC
ratio between horizontal force (drag) and vertical force (load) for a braked wheel in controlled conditions, which is normally a decimal number quoted to two significant figures

Note 1 to entry: LFC varies depending on the slip ratio of the device and the operational speed.

4.7
skid resistance
characterisation of the friction of a road surface when measured in accordance with a standardized method

4.8
wet skid resistance
property of a trafficked surface that limits relative movement between the surface and the part of a vehicle tyre in contact with the surface, when lubricated with a film of water

Note 1 to entry: Factors that contribute to skid resistance include the tyre pressure, contact area, tread pattern, and rubber composition; the alignment, texture, surface pollution, and characteristics of the road surface; the vehicle speed; and the weather conditions.

The change in skid resistance of a surface in service is affected by the volume of traffic and the composition of the traffic, as the tyres of these vehicles polish and/or wear away the surfacing material in different ways. Rubber debris especially affects wet skid resistance.

Where the surface contains aggregate with a coating of binder, e.g. bitumen, resin or Portland cement, the skid resistance will change as the coating is worn away by tyres.

4.9
fixed slip
condition in which a braking system forces the test wheel to roll at a fixed reduction of its operating speed

4.10
fixed slip friction
friction between a test tyre and a airfield surface when the wheel is controlled to move at a fixed proportion of its natural speed

4.11
longitudinal friction coefficient IMAG
LFCI
ratio between the horizontal force in the direction of the motion that can be activated between the test wheel and the wet pavement and the vertical wheel force accomplished under controlled slipping conditions

Note 1 to entry: The controlled slipping condition of the test wheel is achieved by a hydraulic pump and a hydraulic servo-valve enslaved by the sensors of the IMAG.

4.12
sampling length or sampling interval
distance over which responses of the sensors are sampled to determine a single measurement of the recorded variables

Note 1 to entry: The sampling length depends upon the detailed operation of device and its recording system; a number of samples may be combined to determine a measurement for a subsection.

Note 2 to entry: This should not be confused with horizontal resolution which is the shortest distance over which a change in the measured parameter can be detected.

4.13
microtexture
deviation of a pavement from a true planar pavement with characteristic dimensions along the pavement of less than 0,5 mm, corresponding to texture wavelengths with one-third-octave bands and up to 0,5 mm centre wavelengths

Note 1 to entry: Peak to peak amplitudes normally vary in the range 0,001 mm to 0,5 mm.

Note 2 to entry: Microtexture is a primary component in skid resistance at low speeds. Those devices that utilize a relatively low slip speed primarily measure the component of friction affected by microtexture.

4.14
macrotexture
deviation of a pavement from a true planar pavement with characteristic dimensions along the pavement of 0,5 mm to 50 mm, corresponding to texture wavelengths with one-third-octave bands including the range 0,63 mm to 50 mm centre wavelengths

Note 1 to entry: Peak to peak amplitudes normally vary in the range 0,1 mm to 20 mm.

Note 2 to entry: Macrotexture is a major factor influencing skid resistance at high speeds but it also has an effect at low speeds.

4.15
mean profile depth
descriptor of macrotexture, obtained from a texture profile measurement as defined in EN ISO 13473-1 and ISO 13473-2