SLOVENSKI STANDARD
SIST-TS CEN/TS 15901-4:2010

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Značilnosti cestnih in vzletnih površin - 4. del: Postopek določanja torne sposobnosti vozne površine z opremo za vzdolžne meritve s kontroliranim drsenjem (LFCT): Tatra Runway Tester (TRT)

Road and airfield surface characteristics - Part 4: Procedure for determining the skid resistance of pavements using a device with longitudinal controlled slip (LFCT): Tatra Runway Tester (TRT)

Verfahren zur Bestimmung der Griffigkeit von Fahrbahndecken durch Verwendung eines Geräts mit geregeltem Schlupf in Längsrichtung (LFCT): das Tatra-Fahrbahnmessgerät (TRT)

Caractéristiques de surface des routes et aéroports - Partie 4 : Mode opératoire de détermination de l'adhérence d'un revêtement de chaussée à l'aide d'un dispositif à frottement longitudinal contrôlé (CFLT): le Tatra Runway Tester (TRT:Voiture d'essai de piste)

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93.080.10	Gradnja cest	Road construction
93.120	Gradnja letališč	Construction of airports

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Road and airfield surface characteristics - Part 4: Procedure for determining the skid resistance of pavements using a device with longitudinal controlled slip (LFCT): Tatra Runway Tester (TRT)

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Oberflächeneigenschaften von Straßen und Flugplätzen - Teil 4: Verfahren zur Bestimmung der Griffigkeit von Fahrbahndecken durch Verwendung eines Geräts mit geregeltem Schlupf in Längsrichtung (LFCT): das Tatra-Fahrbahnmessgerät (TRT)

This Technical Specification (CEN/TS) was approved by CEN on 27 June 2009 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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Foreword

This document (CEN/TS 15901-4:2009) 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. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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1 Scope

This Technical Specification describes a method for determining the skid resistance of pavements by measurement of the longitudinal friction coefficient LFCT.

The method provides a measure of the skid resistance properties of a bound surface by measurement of the longitudinal friction coefficient using a continuous reading braked test wheel with a slip ratio of 25 % (standard) or a variable slip between 0 % to 100 % (for research measurements).

The test tyre is dragged over a pre-wetted pavement under controlled load and constant speed conditions. The measured values can be affected by the test speed.

This Technical Specification covers the operation of the Tatra Runway Tester (TRT).

The acronym Tatra Runway Tester (TRT) applies to a device, developed by Tatra Kopřivnice in the Czech Republic to perform routine, continuous measurements of friction for long road sections or punctual measurements at different speeds to characterise a particular section. It is not manufactured under license.

A machine conforming to the general characteristics of the TRT and the specific provisions of this Technical Specification may also be used for the tests.

The skid resistance of a pavement is determined by friction measurements and measurements of pavement texture. Where measurement of pavement texture is required, the standard for this measurement and the device is described in EN ISO 13473-1.

2 Normative references

The following referenced documents are 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.

ISO 48, *Rubber, vulcanized or thermoplastic – Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 4662, *Rubber – Determination of rebound resilience of vulcanizates*

3 Fields of application

The TRT is used in the following fields of application:

— network monitoring (Pavement Management);

— approval of new surfacing;

— investigation of surface skid resistance;

— comparative measurements among different devices;

— research measurements.

4 Terms and definitions

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

4.1
skid resistance
characterisation of the friction of a road surface when measured in accordance with a standardised method

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

The skid resistance of a road surface in Europe varies seasonally. Generally, wet skid resistance is higher in winter as a result of the effects of wet detritus and the effects of frost and wear by tyres on microtexture and macrotexture. Wet skid resistance is lower in summer as a result of dry polishing by tyres in the presence of fine detritus.

The change in skid resistance of a surface in service is affected by the volume of traffic and the composition of the traffic, i.e. cars, buses, commercial vehicles of different sizes, as the tyres of these vehicles polish and/or wear away the surfacing material in different ways. The geometry of the road will affect the change in skid resistance. Generally, tyres polish less on straight roads than on bends.

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.

4.4
bound surface
top layer or surface course of a road with the aggregates secured permanently in place

NOTE Aggregates are commonly secured in place by bitumen or Portland cement.

4.5
vertical force
load
force applied by the wheel assembly on the contact area

NOTE Some devices use an assumed load based on the static load.

4.6
horizontal force
drag
horizontal force acting tangentially on the test wheel in line with the direction of travel

4.7
slip ratio
quotient of the slip speed divided by the operating speed

4.8
operating speed
speed at which the device traverses the test surface

4.9
slip speed
relative speed between the test tyre and the travelled surface in the contact area

4.10
fixed slip
condition in which a braking system forces the test wheel to roll at a fixed reduction of its operating speed

4.11
fixed-slip friction
friction between a test tyre and a road surface when the wheel is controlled to move at a fixed proportion of its natural speed

4.12
contact area
overall area of the road surface instantaneously in contact with a tyre

NOTE 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 can be in contact at any instant.

4.13
longitudinal friction coefficient
LFC
ratio between horizontal force (drag) and vertical load (load) for a braked wheel in controlled conditions, which is normally a decimal number quoted to two significant figures

NOTE LFC varies depending on the slip ratio of the device and the operational speed.

4.14
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 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 This should not be confused with horizontal resolution which is the shortest distance over which a change in the measured parameter can be detected.

4.15
subsection
defined length of surface for which one set of the measured variables is reported by the device

NOTE Different devices may use different subsections depending on the context of the measurements, such as 5 m, 10 m or 20 m.

4.16
test section
length of road between defined points (e.g. location references, specific features, or measured distances) comprising a number of subsections over which a continuous sequence of measurements is made

4.17
water delivery system
system for depositing a given amount of water in front of the test tyre so that it then passes between the tyre and the surface being measured

4.18
water flow rate
rate at which water is deposited on the surface to be measured in front of the test tyre

NOTE Water flow rate is expressed in litres per second (l/s).

4.19
theoretical water film thickness
theoretical thickness of a water film deposited on the surface in front of the measuring tyre, assuming the surface has zero texture depth

4.20
wheelpath
part of the pavement where the majority of the vehicle wheel passes are concentrated

NOTE The wheelpath is not a fixed location on a pavement. On a worn pavement, the wheelpath can usually be identified easily visually. On a new pavement, the position of the wheelpath needs to be estimated by experienced operators.

For special circumstances such as acceptance tests, a particular path can be defined, for example (700 ± 150) mm from the edge of the running lane of a road.

4.21
calibration
periodic adjustment of the offset, the gain and the linearity of the output of a measurement method so that all the calibrated devices of a particular type deliver the same value within a known and accepted range of uncertainty, when measuring under identical conditions within given boundaries or parameters

NOTE The calibration method for TRT is given in Clause 12.

4.22
Tatra Runway Tester
TRT
acronym applying to a device, developed by Tatra Kopřivnice in the Czech Republic to perform routine, continuous measurements of friction for long road sections or punctual measurements at different speeds to characterise a particular section

4.23
repeatability
r
maximum difference expected between two measurements made by the same machine, with the same tyre, operated by the same crew on the same section of road in a short space of time, with a probability of 95 %

4.24
reproducibility
R
maximum difference expected between two measurements made by different machines with different tyres using different crews on the same section of road in a short space of time, with a probability of 95 %

5 Safety

Safety measures shall maintain safe working conditions in accordance with current regulations, to ensure the safety of other road users (including measures to control traffic if necessary).