SLOVENSKI STANDARD
SIST-TS CEN/TS 15518-4:2024

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Oprema za zimska vzdrževalna dela - Cestni vremensko-informacijski sistemi - 4. del: Preskusne metode za stacionarno opremo

Winter maintenance equipment - Road weather information systems - Part 4: Test methods for stationary equipment

Winterdienstausrüstung - Straßenzustands- und Wetterinformationssysteme - Teil 4: Prüfverfahren bei stationären Einrichtungen

Matériel de viabilité hivernale - Systèmes d'information météorologique routière - Partie 4 : Méthodes d'essai pour les matériels fixes

Ta slovenski standard je istoveten z: **CEN/TS 15518-4:2023**

ICS:

07.060	Geologija. Meteorologija. Hidrologija	Geology. Meteorology. Hydrology
13.030.40	Naprave in oprema za odstranjevanje in obdelavo odpadkov	Installations and equipment for waste disposal and treatment
35.240.99	Uporabniške rešitve IT na drugih področjih	IT applications in other fields

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TECHNICAL SPECIFICATION

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CEN/TS 15518-4

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Supersedes CEN/TS 15518-4:2013

English Version

Winter maintenance equipment - Road weather information systems - Part 4: Test methods for stationary equipment

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This Technical Specification (CEN/TS) was approved by CEN on 15 October 2023 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.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

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

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European foreword

This document (CEN/TS 15518-4:2023) has been prepared by Technical Committee CEN/TC 337 “Road operation equipment and products”, the secretariat of which is held by AFNOR.

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 supersedes CEN/TS 15518-4:2013.

CEN/TS 15518-4:2023 includes the following significant technical changes with respect to CEN/TS 15518-4:2013:

— revised general specifications;

— revised or added test specifications for embedded sensors:

  — pavement temperature;

  — road body temperature;

  — road surface condition;

  — water film thickness;

  — freezing temperature;

  — amount of de-icing agent;

— added test specifications for remote sensors:

  — surface temperature;

  — water film thickness and surface condition;

  — frost detection;

  — ice film thickness and road condition;

— revised test specifications for atmospheric sensors:

  — air temperature;

  — relative humidity;

  — dew point temperature;

  — wind speed;

  — wind direction;

  — precipitation intensity;

  — visibility;

— deleted test specifications for atmospheric sensors:

  — snow depth.

EN 15518, *Winter maintenance equipment — Road weather information systems*, is currently composed of the following parts:

— *Part 1: Global definitions and components*;

— *Part 2: Road weather — Recommended observation and forecast*;

— *Part 3: Requirements on measured values of stationary equipment*;

— *Part 4 (CEN/TS): Test methods for stationary equipment*.

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 announce this Technical Specification: 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.

Introduction

Road Weather Information Systems (RWIS) are complex structures used for road maintenance decision support, which feature as a rule the following components: meteorological sensors and instruments, transmission technology, computer systems for processing, representation and storing of information, road weather forecasts, alarms, in relation to traffic control and traffic information systems and more.

This European specification lays down the test procedures to verify the requirements on stationary equipment specified in EN 15518-3.

The aim is to allow for objective and reproducible measurement analysis and evaluation.

1 Scope

This document specifies the test methods, the experimental set-up and result analysis for the laboratory qualification of stationary equipment within a RWIS.

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 15518-3, *Winter maintenance equipment — Road weather information systems — Part 3: Requirements on measured values of stationary equipment*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15518-3 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/

4 System and test setup definition

4.1 Introduction

4.1.1 General

The tests described hereafter apply to either a complete system (which can influence the measured value) consisting of sensor, processing electronics and associated terminal program software necessary to acquire, display and store the measurements in a digital form, or some specific parts of the whole system when the inputs can be simulated, as specified by the manufacturer. Figure 1 below is an illustration of the possible functional components of a system.

The manufacturer shall specify and supervise the material set-up for the test set-up.

The manufacturer shall not change the test set-up during the tests. The data shall be readable during the whole test. The whole tests shall stop in case the manufacturer changes the test set-up.

If a single sensor provides measurements subject to more than one test procedure, it shall always be tested against all these procedures within the same test campaign and by the same laboratory. This is also valid for tests after technical changes to a sensor.

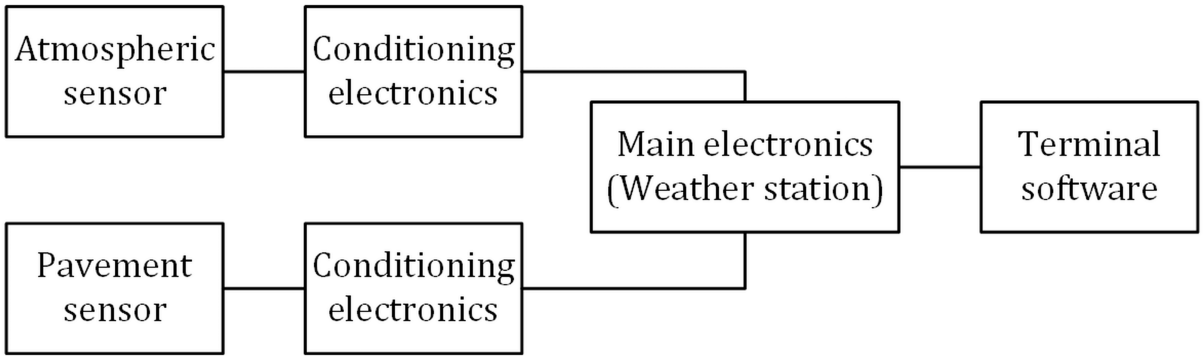

Figure 1 — Possible functional components of a system

Test protocols shall state the version and type of hardware, firmware and software components as well as the material set-up during the test.

In case of major technical changes to one or other of these components which affect the requirements of EN 15518-3, the manufacturer shall seek new certification. In case of minor changes not affecting the requirements of EN 15518-3, the manufacturer shall indicate the changes and, upon request, provide the demonstration that the changes did not affect in an adverse way the system which was originally tested and that the new system still meets the standard.

Generally, in case a sensor was tested as a single device and meets the requirements of this document, and its nominal output can be simulated, the RWIS manufacturer shall be allowed to only demonstrate that the measuring chain cannot influence the raw signal in a manner to exceed the allowed tolerance.

Therefore, this document applies to three possible configurations:

— sensor as single device;

— electronics with simulated sensor inputs;

— complete system.

4.1.2 General rules for issue of certifications according to this standard

Test certificates, which confirm, that a product fulfils the requirements of EN 15518-3, can be issued by every acknowledged laboratory or institution, which is able to fulfil the requirements for performing the tests. Except otherwise is specified for specific sensors.

4.1.3 General requirements for estimation of uncertainties of test procedures and tolerances

For each test procedure, the testing laboratory shall carry out an assessment of the uncertainties to be applied, due to the execution of the test procedures and the used test equipment. All inaccuracies shall be added, which influence the reference value of a test. The uncertainty range resulting from the reference value to be compared shall be documented and the tolerance range to be applied for the acceptance of the test result shall be defined and documented before implementation.

EN ISO/IEC 17025 should be considered accordingly.

The tolerance budget for acceptance consists of the accuracy requirement budget (Acc) derived from the corresponding standard and the total uncertainty (Unc) of the reference and test method of the laboratory.

$$TOL\left(unit\right) = \pm\sqrt{Acc\left(unit\right)^2 + Unc\left(unit\right)^2}$$

where

Tol is the Tolerance budget in terms of the value unit;

Acc is the Accuracy requirement in terms of the value unit;

Unc is the total uncertainties of the test procedure in terms of value unit.

4.2 Pavement surface temperature test for embedded sensors

4.2.1 General

This test is divided into two parts, a stabilized temperature test in order to prove the ability of the sensor to provide accurate temperature reports under stabilized conditions and a transient temperature test in order to prove the ability of the sensor to react appropriately for cooling on the surface e.g. by a clear night.

The device under test shall be able to provide valid measurement values at least every minute via a digital communication interface for processing by a computer.

4.2.2 Stabilized temperature test

4.2.2.1 Test method

The sensor is placed into a temperature calibration bath at stabilized temperatures. The temperature response of the sensor is compared to the temperature response of a reference thermometer.

4.2.2.2 Test equipment

This test requires the following equipment:

— thermal calibration bath;

— reference thermometer with accuracy ±0,1 °C and sampling rate of max. 10 s.

4.2.2.3 Test procedure

Ensure a proper connection of the sensor to be tested and the whole measurement chain. The measurements of the sensor and the reference thermometer shall be recorded throughout the test.

Set the bath to the given temperature (ensure a uniform temperature of the bath (difference < 1 °C) by stirring the liquid). The temperature variation of the bath shall not exceed ±0,1 °C throughout the duration of each test.

Place the sensor into the liquid bath so that it does not touch the bottom or the walls of the container.

The measurement period shall start as soon as calibration bath and DUT has stabilized (for 5 min within ±0,1 °C):

— the reference thermometer has shown bath temperatures within requirements for 6 min.

The measurement period ends as soon as one of the following conditions is met:

— 5 consecutive samples (or all the samples during 10 min, whichever is longer) of the sensor to be tested are recorded within the accuracy requirements;