



SLOVENSKI STANDARD

SIST EN 513:2019

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Nadomešča:
SIST EN 513:2000

Polimerni materiali - Profili na osnovi polivinilklorida (PVC) - Ugotavljanje odpornosti proti vremenskim vplivom s pospešenim staranjem

Plastics - Poly(vinyl chloride) (PVC) based profiles - Determination of the resistance to
artificial weathering

Kunststoffe - Profile auf Basis von Polyvinylchlorid (PVC) - Bestimmung der
Wetterechtheit und Wetterbeständigkeit durch künstliche Bewitterung

Plastiques - Profilés à base de poly(chlorure de vinyle) (PVC) - Détermination de la
résistance au vieillissement artificiel

Ta slovenski standard je istoveten z: **EN 513:2018**

ICS:

83.140.99	Drugi izdelki iz gume in polimernih materialov	Other rubber and plastics products
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EUROPEAN STANDARD

EN 513

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English Version

Plastics - Poly(vinyl chloride) (PVC) based profiles - Determination of the resistance to artificial weathering

Plastiques - Profilés à base de poly(chlorure de vinyle)
(PVC) - Détermination de la résistance au
vieillessement artificiel

Kunststoffe - Profile auf Basis von Polyvinylchlorid
(PVC) - Bestimmung der Wetterechtheit und
Wetterbeständigkeit durch künstliche Bewitterung

This European Standard was approved by CEN on 26 October 2018.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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
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European foreword

This document (EN 513:2018) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

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 June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

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 EN 513:1999.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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

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EN 513:2018 (E)**1 Scope**

This document specifies a method for exposing specimens made from poly(vinyl chloride) (PVC) based profiles to xenon-arc radiation, in order to assess changes in characteristics.

It is applicable to PVC based profiles including those covered with foil, lacquered or coextruded.

NOTE The determination of changes in colour and variations of properties after exposure of PVC based profiles to xenon-arc radiation is described in an informative Annex A.

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 17271¹, *Plastics — Poly(vinyl chloride) (PVC) based profiles — Determination of the peel strength of profiles laminated with foils*

EN ISO 472, *Plastics - Vocabulary (ISO 472)*

EN ISO 4892-1:2016, *Plastics - Methods of exposure to laboratory light sources - Part 1: General guidance (ISO 4892-1:2016)*

EN ISO 4892-2:2013, *Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps (ISO 4892-2:2013)*

ISO 9370, *Plastics — Instrumental determination of radiant exposure in weathering tests — General guidance and basic test method*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 472 and the following 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 <http://www.iso.org/obp>

3.1 radiant exposure

H

time integral of irradiance

Note 1 to entry: measured in joules per square metre (J/m²)

[SOURCE: ISO 9370:2017, 3.27]

¹ Under preparation. Stage at time of preparation: prEN 17271:2018.

4 Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply.

PVC-U	unplasticized poly(vinyl chloride)
PVC-UE	expanded unplasticized poly(vinyl chloride)
BST	black-standard thermometer
WST	white-standard thermometer

5 Principle

Specimens taken from the surface of a profile, submitted to weathering in practice, are exposed to xenon-arc radiation at specified irradiance, black and white standard temperatures, relative humidity and spray cycle.

After the exposure, the changes in characteristics of the specimens are determined.

6 Apparatus

The apparatus shall comply with EN ISO 4892-1 and EN ISO 4892-2 and shall include:

- a) a xenon-arc lamp in accordance with method A of EN ISO 4892-2:2013 with a spectral irradiance in the band pass of 300 nm to 800 nm of (550 ± 55) W/m² or a spectral irradiance in the band pass of 300 nm to 400 nm of (60 ± 2) W/m² or a spectral irradiance at 340 nm of $(0,51 \pm 0,02)$ W/(m² nm).

NOTE 1 In apparatuses with rotating specimen holders the relation of UV/(UV+VIS) irradiance depends strongly on the reflection behaviour of the specimens in the test chamber. The reflection of the specimens is wavelength dependent. The UV/(UV+VIS) relation is not a constant. The relation changes with the reflection behaviour of the specimens.

NOTE 2 Comparing apparatuses controlled at different wavelength ranges tolerances can be higher due to the conversion. Typical ranges are (550 ± 120) W/m² for a spectral irradiance in the band pass of 300 nm to 800 nm, (60 ± 12) W/m² for a spectral irradiance in the band pass of 300 nm to 400 nm and $(0,51 \pm 0,08)$ W/(m² nm) for a spectral irradiance at 340 nm.

- b) a black-standard thermometer (BST) in accordance with EN ISO 4892-1:2016, 5.2, and EN ISO 4892-2:2013, 6.2.1, and a means of recording temperatures during one cycle;
- c) a white-standard thermometer (WST) in accordance with EN ISO 4892-1:2016, 5.2, and EN ISO 4892-2:2013, 6.2.1, and a means of recording temperatures during one cycle;
- d) a device to determine the radiant exposures stated in a) according to ISO 9370;
- e) specimen holders in the form of an open frame, leaving the back of the specimen exposed according to EN ISO 4892-2:2013, 4.6.

7 Test specimens

The number of test specimens shall be as specified in the referring standard.

NOTE Additional details regarding test specimens for determining changes in colour and variations of properties after exposure of PVC based profiles to xenon-arc radiation are given in Annex A.

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The test specimens shall be taken from the surface of the profile, exposed to UV radiation, such that the longitudinal directions of the test specimens and the profile are the same.

Store in the dark the non-exposed reference test specimens.

8 Conditioning

Unless otherwise specified, conditioning is not required before an exposure to laboratory radiation sources.

NOTE Additional details regarding conditioning before determining changes in colour and variations of properties after exposure of PVC based profiles to xenon-arc radiation are given in Annex A.

9 Weathering test conditions

Two different weathering test conditions of exposure are defined:

- method 1 (M);
- method 2 (S).

The test conditions are specified in Table 1.

Table 1 — Weathering test conditions for method 1 (M) and method 2 (S)

Method 1 (M)					
Exposure period	UV irradiance		Black-standard temperature	White-standard temperature	Relative humidity
	Broadband (300 nm to 400 nm)	Narrowband (340 nm)			
	W/m ²	W/(m ² nm)	°C	°C	%
102 min dry 18 min water spray	60 ± 2 60 ± 2	0,51 ± 0,02 0,51 ± 0,02	60 ± 3 —	40 – 45 —	65 ± 10 —
Method 2 (S)					
Exposure period	UV irradiance		Black-standard temperature	White-standard temperature	Relative humidity
	Broadband (300 nm to 400 nm)	Narrowband (340 nm)			
	W/m ²	W/(m ² nm)	°C	°C	%
114 min dry 6 min water spray	60 ± 2 60 ± 2	0,51 ± 0,02 0,51 ± 0,02	65 ± 3 —	45 – 50 —	65 ± 10 —
The air temperature and/or the air velocity in the test chamber shall be controlled to a constant value such that the BST and WST temperatures equal the required values at the end of the dry period.					
NOTE Typical chamber temperature settings are below 38 °C depending on the instrument type.					

10 Procedure

Put the test specimens in the specimen holders in accordance with Clause 6, e). Select the appropriate filter arrangement to achieve the spectral irradiance distribution in accordance with EN ISO 4892-2:2013, method A.

Before placing the specimens in the test chamber, be sure that the apparatus is operating under the desired conditions (see Clause 9).

Expose the test specimens with the surfaces exposed to UV radiation towards the xenon-arc lamps, to the radiant exposure, as specified in the referring standard.

During the exposure:

- a) control and record the air temperature in the test chamber;
- b) control and record the BST temperature;
- c) monitor the WST temperature.

At regular intervals check and record the irradiance in accordance with Clause 6, a).

When the specified radiant exposure is reached according to the referring standard, stop the exposure.

Take the test specimens out of the specimen holder.

Do not clean the test specimens, unless specified otherwise by the referring standard. Any deviation shall be noted in the test report.

Prepare the test specimens and determine the changes in properties as specified in the referring standard.

NOTE Additional details regarding determination of changes in colour and variations of properties after exposure of PVC based profiles to xenon-arc radiation are given in Annex A.

11 Test report

The test report shall include the following information:

- a) reference to this document (i.e. EN 513);
- b) method of exposure (method 1 or method 2);
- c) laboratory of testing;
- d) full identification of the profile;
- e) period of testing;
- f) apparatus and test conditions, including:
 - 1) type of apparatus;
 - 2) type of radiation source and filter system used;
 - 3) BST temperature set values with tolerances during the exposure;
 - 4) WST temperature range during the exposure;
 - 5) relative humidity in the test chamber;