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**Barve in laki - Premazni sistemi za lopatice rotorjev vetrnih turbin - 1. del:  
Minimalne zahteve in vremenski vplivi (ISO/TS 19392-1:2018)**

Paints and varnishes - Coating systems for wind-turbine rotor blades - Part 1: Minimum requirements and weathering (ISO/TS 19392-1:2018)

Beschichtungsstoffe - Beschichtungssysteme für Rotorblätter von Windenergieanlagen - Teil 1: Mindestanforderungen und Bewitterung (ISO/TS 19392-1:2018)

Peintures et vernis - Matériaux de revêtement pour pales de turbines éoliennes - Partie 1: Exigences minimales et érosion (ISO/TS 19392-1:2018)

**Ta slovenski standard je istoveten z:**

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87.040	Barve in laki	Paints and varnishes

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# TECHNICAL SPECIFICATION

# ISO/TS 19392-1

First edition  
2018-04

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## Paints and varnishes — Coating systems for wind-turbine rotor blades —

### Part 1: Minimum requirements and weathering

*Peintures et vernis — Matériaux de revêtement pour pales de turbines  
éoliennes —*

*Partie 1: Exigences minimales et érosion*

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# Contents

Page

Foreword.....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	2
4 Requirements and test methods.....	2
5 Sampling.....	2
6 Preparation of test specimen.....	2
7 Test methods.....	2
7.1 Initial test methods.....	2
7.2 Test methods after artificial weathering.....	3
7.3 Test methods after humidity exposure.....	4
7.4 Test methods after cyclic exposure.....	4
7.5 Tensile tests.....	5
8 Test report.....	5
Annex A (informative) Test cycles for cyclic exposure.....	6

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## ISO/TS 19392-1:2018(E)

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

A list of all parts in the ISO 19392 series can be found on the ISO website.  
<https://standards.iteh.ai/catalog/standards/sist/6535e4b8-a3d4-440d-8ae9-5faa18dad579/ksist-ts-fprcen-iso-ts-19392-1-2022>

## Introduction

In the wind energy industry, coatings are applied to rotor blades surface to protect the glass fibre reinforced polymer composite substrate. Rain drops and hailstones can damage these coatings in such a way that individual layers come off or the whole coating delaminates from the substrate.

This document describes the minimum requirements and weathering of the coating system. Rain erosion can be simulated by means of high speed water jets or water droplets impinging on the specimen surface. ISO/TS 19392-2 describes a method which simulates rain erosion by accelerating one or more coated panels, attached to the end of rotating arms, through a simulated rain field at a constant rotational velocity. ISO/TS 19392-3 describes a method where a water jet or a series of water jets at a defined pressure hits the surface of the specimen.

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# Paints and varnishes — Coating systems for wind-turbine rotor blades —

## Part 1: Minimum requirements and weathering

### 1 Scope

This document specifies minimum requirements and weathering for coating systems for wind-turbine rotor blades.

### 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.

ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles*

ISO 527-3, *Plastics — Determination of tensile properties — Part 3: Test conditions for films and sheets*

ISO 1513, *Paints and varnishes — Examination and preparation of test samples*

ISO 2813, *Paints and varnishes — Determination of gloss value at 20°, 60° and 85°*

ISO 4624, *Paints and varnishes — Pull-off test for adhesion*

ISO 4628-2, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 2: Assessment of degree of blistering*

ISO 4628-4, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 4: Assessment of degree of cracking*

ISO 4892-3, *Plastics — Methods of exposure to laboratory light sources — Part 3: Fluorescent UV lamps*

ISO 6270-2, *Paints and varnishes — Determination of resistance to humidity — Part 2: Condensation (in-cabinet exposure with heated water reservoir)*

ISO 11664-4, *Colorimetry — Part 4: CIE 1976 L\*a\*b\* Colour space*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

ISO 16474-2, *Paints and varnishes — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*

ISO 16474-3, *Paints and varnishes — Methods of exposure to laboratory light sources — Part 3: Fluorescent UV lamps*

ISO/TS 19392-2, *Paints and varnishes — Coating systems for wind-turbine rotor blades — Part 2: Determination and evaluation of resistance to rain erosion using rotating arm*

ISO/TS 19392-3, *Paints and varnishes — Coating systems for wind-turbine rotor blades — Part 3: Determination and evaluation of resistance to rain erosion using water jet*

## ISO/TS 19392-1:2018(E)

IEC 60068-2-14, *Environmental testing — Part 2-14: Tests — Test N: Change of temperature*

IEC 61215-2, *Terrestrial photovoltaic (PV) modules — Design qualification and type approval — Part 2: Test procedures*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions 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 <https://www.iso.org/obp>

#### 3.1

##### **weathering**

exposure of test specimens to all prevailing elements of the atmosphere

### 4 Requirements and test methods

The coating material shall meet the requirements given in [Tables 1](#) to [5](#).

### 5 Sampling

Take a representative sample of the coating material in accordance with ISO 15528.

Examine and prepare the sample for testing, as described in ISO 1513.

### 6 Preparation of test specimen

Prepare the test specimen in accordance with the required test method (see [Tables 1](#) to [5](#)). The substrate shall be agreed between the interested parties.

### 7 Test methods

#### 7.1 Initial test methods

Carry out the test methods, as specified in [Table 1](#).

**Table 1 — Initial test methods**

Characteristic	Requirement	Test method
Adhesive strength fracture type	>5 MPa only cohesion fracture  >7 MPa adhesion or cohesion fracture	ISO 4624
Gloss	< 30 GU <sup>a</sup>	ISO 2813 (60° geometry)
Rain erosion resistance	ISO/TS 19392-2 or ISO/TS 19392-3 <sup>b</sup>	ISO/TS 19392-2  ISO/TS 19392-3
<sup>a</sup> Maximum requirements for initial gloss can vary depending on national requirements and/or regulations.		
<sup>b</sup> Method to be agreed by interested parties.		