

English Version

**Paints and varnishes - Coating systems for wind-turbine  
rotor blades - Part 1: Minimum requirements and  
weathering (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)

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

This Technical Specification (CEN/TS) was approved by CEN on 20 June 2022 for provisional application.

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

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## European foreword

The text of ISO/TS 19392-1:2018 has been prepared by Technical Committee ISO/TC 35 "Paints and varnishes" of the International Organization for Standardization (ISO) and has been taken over as CEN ISO/TS 19392-1:2022 by Technical Committee CEN/TC 139 "Paints and varnishes" the secretariat of which is held by DIN.

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## Endorsement notice

The text of ISO/TS 19392-1:2018 has been approved by CEN as CEN ISO/TS 19392-1:2022 without any modification.

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## 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)).

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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.

## 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.

# 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*

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.		