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European foreword

This document (CEN/TS 927-12:2023) has been prepared by Technical Committee CEN/TC 139 “Paints and varnishes — Coating materials and coating systems for exterior wood — Ultraviolet and visible radiation transmittance”, the secretariat of which is held by DIN.

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Introduction

Wood is a natural material that must be protected against solar radiation, heat, rain, and microorganisms to maintain its appearance and mechanical integrity when used outdoors. Wood and its components (especially lignin) are sensitive to photo oxidation and must therefore be protected by suitable coatings, particularly against ultraviolet (UV) and visible (VIS) radiation in the violet and blue region.

Clear and transparent coating films may be modified by fine sized transparent (mostly yellow or red ferrous oxide-based) pigments and more or less colourless, organic and inorganic UV-absorbers to reduce the harmful part of solar radiation. As these additives are not visible, there is a demand for a test method to determine their efficiency.

The transmittance in a specific wavelength range allows to evaluate the UV and VIS radiation protection of a coating film.

1 Scope

This document describes a test method to measure the ultraviolet (UV) and visible (VIS) spectral transmittance in the wavelength range from 280 nm to 700 nm of coatings for exterior wood. From the spectral transmittance the transmittance of UV, VIS and the combined UV and VIS wavelength range can be calculated.

It is applicable to free coatings films or coatings applied on a UV-transparent substrate.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 2808, *Paints and varnishes - Determination of film thickness (ISO 2808)*

EN ISO 4618, *Paints and varnishes - Terms and definitions (ISO 4618)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 4618 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
transmittance
τ
quotient of transmitted radiant flux, Φ_t, and incident radiant flux, Φ_m

$$\tau = \frac{\Phi_t}{\Phi_m}$$

Note 1 to entry: Transmittance is also defined spectrally in terms of wavelength, in which case, “spectral” is added before the quantity name.

Note 2 to entry: Due to energy conservation, $\alpha + \rho + \tau = 1$ except when polarized radiation is observed, where α is absorptance and ρ is reflectance.

Note 3 to entry: Transmittance, τ, is the sum of regular transmittance, τ_r, and diffuse transmittance, τ_d: $\tau = \tau_r + \tau_d$.

Note 4 to entry: The transmittance has unit one.

[SOURCE: CIE S 017:2020]

4 Abbreviations

UV ultraviolet radiation in the wavelength range from 280 nm to 400 nm

VIS visible radiation in the wavelength range from 400 nm to 700 nm