
Oprema, ki se uporablja za pripravo pitne vode v stavbah - Naprave, ki uporabljajo enote UV LED - Zahteve za delovanje, varnost in preskušanje

Water conditioning equipment inside buildings - Devices using UV LED units - Requirements for performance, safety and testing

Wasserbehandlungsgeräte in Gebäuden - Geräte mit UV-LED-Strahlereinheiten - Anforderungen an Leistung, Sicherheit und Prüfung.

Équipement de conditionnement de l'eau à l'intérieur des bâtiments - Dispositifs utilisant des unités LED UV - Exigences en matière de performance, de sécurité et d'essais

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English Version

**Water conditioning equipment inside buildings - Devices
using UV LED units - Requirements for performance, safety
and testing**

Équipement de conditionnement de l'eau à l'intérieur
des bâtiments - Dispositifs utilisant des unités LED UV -
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d'essais.

Wasserbehandlungsgeräte in Gebäuden - Geräte mit
UV-LED-Strahlereinheiten - Anforderungen an
Leistung, Sicherheit und Prüfung.

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prEN 18380:2026 (E)**European foreword**

This document (prEN 18380:2026) has been prepared by Technical Committee CEN/TC 164 “water supply”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

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Introduction

A non-exhaustive list of potential applications of products described in this document:

- upstream microbiological control ahead of water softeners, or treatment processes which remove a residual disinfectant (e.g. activated carbon);
- within commercial drinks dispensers as a final polishing/assurance stage;
- as a point of entry system where the municipal supply may be at risk of recontamination within distribution or interruption of sufficient disinfection at source;
- Legionella control in hot water loops.

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1 Scope

This document specifies definitions, principles of construction, requirements and methods for testing the performance of UV devices (240 nm to 290 nm nominal) for potable water installations according to EN 806-2 which are permanently connected to the building's supply.

Devices described by this document can be installed at the point of entry (POE), within the water distribution system inside the building or at the point of use (POU).

Additionally, the devices described in this document can be used in mobile or temporary potable water installations, where the system is not permanently connected to a water supply.

UV devices in the sense of this document are UV bactericidal treatment devices or UV disinfection devices for one of three specified water qualities, determined by the observed UV transmittance.

Devices can be standalone, integrated into a larger appliance or part of multi-staged treatment process. The document relates solely to the performance of the UV reactor.

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 10253 (all parts), *Butt-welding pipe fittings*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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/>

3.1 absorption

reduction in radiant energy or power, including transformation to other forms, e.g. heat, chemical, as a ray passes through or impinges upon a material

Note 1 to entry: Expressed in J or W, as appropriate.

3.2 irradiance

measure of the UV light flux divided by the area that intercepts the radiation

Note 1 to entry: The irradiance measured in UV disinfection devices by the UV device sensor is mainly influenced by the lamp output, the transmittance of the water, scaling/fouling of the protective window, and the position of the lamp(s) and sensor in the radiation chamber.

Note 2 to entry: Expressed in W/m².

3.3

disinfection

action of killing or inactivating relevant bacteria, viruses, and spores to a specified degree of at least 99,99 % using a UV disinfection device

Note 1 to entry: Verification of reduction rates is done by biodosimetric testing on surrogate microbes.

3.4

fluence

dose, product of irradiance and exposure time

Note 1 to entry: Fluence is the correct term from a strictly scientific point of view.

Note 2 to entry: Fluence is expressed in J/m².

3.5

reduction equivalent fluence

REF

average germicidal fluence measured using the biodosimeter

Note 1 to entry: Expressed in J/m².

Note 2 to entry: Use of a low pressure mercury discharge lamp as reference gives a value for a relative exposure at 254 nm; REF (254 nm).

3.6

radiation chamber

part of the device that comprises the radiation zone and the connecting pipes, through which the water to be treated flows

3.7

radiation zone

part of the radiation chamber whose volume is used for the calculation of the fluence

3.8

exposure time

volumetric mean

time interval during which a specific volume of water within the radiation zone is exposed to the radiation

3.9

microbial dosimeter;

biodosimeter, surrogate

test microbe used to determine the reduction equivalent fluence, whose UV inactivation behaviour has been determined in a standard collimated beam apparatus

Note 1 to entry: In the case of this document, MS2 phage (ATCC 15597-B1).

3.10

minimum irradiance

UV sensor value determined in the type test that ensures the required reduction equivalent fluence at a defined water flow rate and at a defined UV transmittance value

Note 1 to entry: Expressed in W/m².

prEN 18380:2026 (E)**3.11****flow rate** **Q**

volume of water per unit time flowing through the UV device

Note 1 to entry: Expressed in l/min or m³/h.**3.12****maximum flow rate** **$Q_{\max}$**

highest flow at which, at a defined UV transmittance of the water and a defined irradiance, the required reduction equivalent fluence can be guaranteed

Note 1 to entry: Expressed in l/min or m³/h.**3.13****permissible operation range**

those limit values for the operation parameters (irradiance at the sensor or UV transmittance of the water) and flow rate where adequate bactericidal treatment or disinfection is assured

3.14**sensor**

system for the measurement of the relative irradiance in UV disinfection devices

Note 1 to entry: A relative signal may be used and calibration to an absolute irradiance [W m⁻²] is not required.**3.15****attenuation**

total reduction in transmission (absorption and scattering) of radiation passing through an optical medium in a specific direction

3.16**lamp service life**

service life of a UV LED unit after which the emission that is necessary to guarantee the minimum fluence can no longer be reached under the mode of operation given by the manufacturer

3.17**UV LED unit**

grouped UV LEDs which produces UV light

3.18**UV LED device**

general expression for products using UV light to irradiate water flow through, with the purpose of inactivating microbes present in the water

3.19**UV LED disinfection device**

device designed to disinfect water

Note 1 to entry: Category A device.

3.20**UV LED bactericidal treatment device**

device designed for bactericidal water treatment

Note 1 to entry: Category B device.

3.21**turbidity**

reduction of transmittance of visible wavelengths through a liquid caused by the presence of suspended matter (via scattering or scattering and absorption)

Note 1 to entry: Turbidity is not directly related to UV transmittance.

3.22**UV transmittance****% UVT₁₀**

spectral transmission rate at a wavelength of 254 nm at an optical path length in the medium of 10 mm, in %.

Note 1 to entry: UVT₁₀₀ is a similar metric, scaled for an optical path length of 100 mm.

Note 2 to entry: In general, the UV transmittance includes the influence of scattering and absorption of the medium. The UV transmittance is measured in the unfiltered sample in quartz cuvettes of at least 40 mm at a wavelength of 254 nm in a spectrophotometer and is given in %.

3.23**UV radiation****UV**

electromagnetic radiation

Note 1 to entry: Table 1 shows different wavelengths of UV radiation and their classification:

Table 1 — UV radiation

Type	Wavelength nm
UV-C	$> 100 \leq 280$
UV-B	$> 280 \leq 315$
UV-A	$> 315 \leq 400$
NOTE For bactericidal and disinfection purposes, part of the UV range is used.	

3.24**modal peak wavelength**

wavelength at which the UV LED device emits its highest intensity radiation

Note 1 to entry: I.e. at the peak of a spectral emission curve, expressed in nm.

3.25**spectral full-width half-maximum****FWHM**

measure of the breadth of an LED emission spectrum, taken as the width of the spectrum, at 50 % of the relative intensity

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3.26

sampling event

action of drawing a sample of the test water from one of the sampling ports or a holding tank, within the biodosimetric testing phase

3.27

measurement point

set of operational conditions under which samples of the test water are drawn; multiple sampling events occur at a single measurement point, within the biodosimetric testing phase

4 Requirements

4.1 General

This document covers two different categories of UV LED devices. The categories differ in terms of their validated fluence delivery, at a specified flow rate and water quality, resulting in differences in the associated microbiological treatment of the water leaving the reactor.

Both performance Categories A and B are intended to provide a pathogen barrier and maintain the user's health, though the degree of treatment varies between the two based on the intent of the application. A distinction is drawn between the two treatment levels as follows:

- Category A provides disinfection at a fluence known to be sufficient where no primary antimicrobial treatment has been applied upstream; waters of uncertain origin, influence, or where treatment is known **not** to exist upstream should be treated to this level.
- Category B provides microbial control at a fluence intended as a secondary or higher treatment stage to water which has otherwise undergone disinfection; water which may be subject to incidental/retrograde contamination in distribution, stagnation, or microbial regrowth after otherwise sufficient disinfection should be treated to this level.

This document primarily considers systems whose main function is the treatment of water by UV irradiation and though an integrated system may be considered, the following distinctions hold:

- Water quality is defined as that which enters the UV disinfection portion of the system, which may not necessarily be the inlet port of a host system to the UV device, and the effect of upstream modifications to the water quality within the system may be considered when defining the UV LED device inlet water quality.
- Assessment of disinfection/antimicrobial effect will only consider the action of the UV LED device, with no 'credit' ascribed to upstream processes.