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Disinfection using ultraviolet radiation — Methods for quantitative testing of automated ultraviolet disinfection activities by direct illumination — Determination of bactericidal, mycobactericidal, sporicidal, yeasticidal, fungicidal, virucidal and phagocidal activities

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Summary of pages
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Foreword

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Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

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Introduction

This British Standard specifies a standard method for confirming under controlled laboratory conditions that automated ultraviolet (UV) radiation systems meet the efficacy objectives for which they are intended and to allow cross-comparison of different systems based on a defined surface-to-emitter distance and direct line-of-sight application. The standard defines the log reductions required to support microbicidal activity claims.

It applies to surface disinfection within a space, where the UV travels to the surface through the air, via an automated process.

Efficacy against each type of microorganism can be claimed independently; however, to claim compliance with the standard a pass needs to be achieved against vegetative bacteria and yeasts as the minimum requirement.

A claim for activity against a type of microorganism can only be made if a pass is achieved against all the test microorganisms in that group relevant to the use claim (see Annex A).

UV radiation travels in straight lines and objects within the path of travel prevent passage of the UV and create a shadow. It is not possible to standardize the microbicidal effects of UV in shadow areas; however, the efficacy of UV radiation within a shadowed area is lower than the efficacy achieved in direct illumination. This British Standard evaluates the efficacy of UV systems based on direct line-of-sight application of UV to a surface. The use of carriers located horizontally replicates the challenge of many important surfaces and represents a reasonable worst case. There are implications for users of UV systems of shadowed areas when applying UV disinfection technologies.

The UV systems are tested at a defined distance from the microorganism challenge. The intensity of UV radiation decreases with increasing distance from the emitting source, so users should be aware of the impact of distance on microbicidal efficacy when positioning UV systems.

Every automated UV disinfection cycle/application is unique and enclosure treatment can be influenced by the design and geometry of the treated area(s). This British Standard provides a defined challenge to be met for an automated UV disinfection system to be considered efficacious. This standard test method should therefore be regarded as a useful starting point and not as a validation for all intended treatments in all areas with a particular automated UV disinfection system.

The standard draws on the microorganism preparation, carrier inoculation and microorganism recovery methodology specified in BS EN 17272:2020.

1 Scope

This British Standard specifies a method of determining the disinfection capability of processes for enclosures in the human health, veterinary, food, industrial and institutional sectors using ultraviolet (UV) radiation.

The objective of the processes concerned is to disinfect the surfaces of the overall area, including the external surfaces, of the equipment contained in such enclosures.

This British Standard is applicable to UV disinfection systems for which microbicidal activity is claimed against the following types of microorganism:

- vegetative bacteria, including mycobacteria;
- bacterial spores;
- yeasts;
- fungal spores;