

## Basis for the use of disinfectants

**Constantly practised and often unknowingly – the use of disinfectants in daily life at clinics and nursing homes.**

Can you remember all the areas of effectiveness or even the standards for evaluation and selection of the appropriate chemical? Dr. Bernd Sonnberger from Buzil recalls the most important facts.

Chemical, microbiological and legal bases for the use of disinfectants are often disregarded in day-to-day life. Into which effective areas are disinfectants classified, what active ingredients do they contain and when is each disinfectant used? What laws must be observed? First of all, it is vital to describe the overall effectiveness of disinfectants. This is generally tested with representative test bacteria, and the effective spectrum against other types of pathogen is derived using their phylogenetic relationships to the test bacteria. The following areas of effectiveness can be distinguished:

- **Fungicidal:** against fungi and yeasts
- **Yeasticidal:** against yeasts
- **Bactericidal:** against bacteria (except mycobacteria and spore formers)
- **Mycobactericidal:** against mycobacteria including TBC
- **Tuberculocidal:** against TBC
- **Sporicidal:** against spore formers
- **Virucidal:** against viruses; difference: full (effective against enveloped and non-enveloped viruses) and limited effectiveness (only effective against enveloped viruses)



With bactericidal effects, the proven effectiveness extends without restriction to the antibiotic-resistant bacteria (e.g. MRSA). This is because, unlike antibiotics, disinfectants do not affect metabolic steps, but destroy the bacteria in a chemical reaction. Changes in metabolic processes caused by mutations, which lead to formation of resistance against antibiotics are ineffective against disinfectants. The table provides an overview of the effectiveness of commonly used active ingredients. When comparing the individual substances, it is apparent that the quaternary ammonium compounds, which are widely used due to their material compatibility and application safety, only have a limited effective area. Besides the bacteria most important for daily hygiene, this area of effectiveness also includes pathogens from hospital-acquired infections. The composition is not intended as a substitute for the determination of a preparation for a specific application area.

**HOW IS TESTING CARRIED OUT?** Antimicrobial efficacy is strongly correlated with not only the organisms being combated, but also with the intended application area (medical, veterinary, comestible, industrial, institutional, domestic) and the objects actually being disinfected (hands, equipment, surfaces). As the conventional methods for their examination are often different in the individual countries (e.g. with regard to the test conditions and test strains used), universally applicable test standards were developed within the framework of the standardised European legislation (see below). These are divided into different categories according to the underlying experimental effort and the significance:

**Phase 1:** Simple laboratory tests in the test tube (quantitative suspension tests) to confirm the fundamental effectiveness without taking into account the intended application. They are for guidance only and do not serve as application recommendations.



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## EFFECTIVENESS OF ACTIVE INGREDIENTS IN DISINFECTANT

Active ingredients/ effect	bactericide	fungicide	Mycobac- tericide	sporicide	virucide	Limited virucidal effect
Alcohols	+	+	+	-	-	+
Aldehydes	+	+	+	+	(+)	+
Peroxides	+	+	+	+	+	+
Chlorine compounds	+	+	+	+	+	+
Phenols	+	(+)	+	-	-	(+)
Amines	+	+	+	-	-	+
Quaternary ammonium compounds	(+)	+	-	-	-	+

- Not effective, (+) Effective with larger effectiveness gaps, + effective (with at most isolated effectiveness gaps)

*This is how disinfectants work..*

**Phase 2, stage 1:** Quantitative suspension tests taking into account the intended application areas by adding potentially interfering substances such as proteins.

**Phase 2, stage 2:** Laboratory tests on surfaces simulating practical conditions (hands, test surfaces, instruments).

**Phase 3:** Field tests in the property (here there are no respective standards). The "EN standards" table, which is available to download, shows the most important standards with the target organisms, significance (phase/step) and application area, which are to be used for the evaluation and selection of a disinfectant.

**WHICH LAWS APPLY?** Disinfectants are governed in Europe by Regulation no. 528/2012 on biocidal products (Biocides Regulation). This states that only products based on specifically approved active ingredients are now allowed to be used. It is not only the active substances themselves that are subject to an approval, but also the products formulated with them. In both cases, the approval procedures are very complex and costly. They include extensive investigations into the effects on humans and the environment as well as proof of effectiveness on the basis of the EN standards described. Because approval procedures have currently only been completed for a few active ingredients in disinfectant, country-specific transitional provisions apply, which contain different national approval requirements depending on the member state. In Germany, the legal requirements are modest. There are governmental and non-governmental organisations that issue lists of products tested according to their own standards:

- **Association for Applied Hygiene (VAH)** – private organisation that deals with various aspects of hygiene management. The list that it publishes constitutes a nationwide, unofficial standard for such things as the selection of products for routine disinfection in public areas.
- **Robert Koch Institute (RKI)** – national health authority that publishes such things as a list of tested disinfectants and disinfectant methods, the use of which is prescribed in the event of the outbreak of an epidemic. Listing of various effective areas is carried out according to the type of pathogens.
- **Industrial Association for Hygiene and Surface Protection (IHO)** – industry association of producers of cleaning agents and disinfectants, which issues such things as a list of disinfectants against viruses and for application in the food industry tested in accordance with EN standards.



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It should be noted that many RKI and VAH methods are also accepted by foreign authorities for registration purposes. The priority criteria when selecting a disinfectant is the available proof of effectiveness for the target organisms and the intended application area, which must as a minimum comply with the requirements of phase 2/step 1. A further criterion for the selection are the active ingredients used, where safe and material-compatible active ingredients, such as quaternary ammonium compounds, are the first choice for routine surface disinfection. Alcohol-based disinfectants work quickly and dry without leaving any residues. Due to their high consumption and the air pollution, they are only suitable for localised use. Products based on active agents that are aggressive or require additional protective measures for workers (such as aldehydes), should only be used for specifically combating special bacteria and not for daily hygiene measures.



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The products from the Buzil disinfection portfolio offer a high degree of reliability due to independently proven effectiveness. From hand disinfection and routine surface disinfection right up to mandatory decontamination measures, the portfolio offers the exact products for every application. Recognised national and international listings and certifications such as VAH, IHO and RKI are positive proof of their efficiency.

More detailed product information on our disinfection portfolio is available online at [www.buzil.com](http://www.buzil.com), via our telephone customer service or directly via your Buzil specialist wholesaler adviser.



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