TECcare®
Antimicrobial Technologies

TECcare® Antimicrobial Technology Platforms

TECcare® ULTRA

TECcare® CONTROL

TECcare® PROTECT

- Micro-organisms such as bacteria, viruses, fungi and bacterial spores can be spread through a range of recognised transmission pathways which include the hands (skin), environmental surfaces and air.
- TECcare® manufacture a range of world class antimicrobial technology platforms which are specifically designed to reduce the risk of infection and cross contamination by interrupting these key transmission pathways.
- The three TECcare® antimicrobial technology platforms are TECcare® PROTECT, TECcare® CONTROL and TECcare® ULTRA.
- The chemistry behind each technology platform is highly advanced and differs markedly from one platform to another.
- Each technology platform can be adapted for a wide range of uses across a host of application areas.
- What truly sets the TECcare® antimicrobial technology platforms apart from other disinfectant chemicals / technologies is the unparalleled combination of optimum antimicrobial efficacy coupled with extremely high levels of safety when in use.

www.TECcare.com

What is the TECcare® ULTRA technology platform?

TECcare® ULTRA is a world class ultra-high level sporicidal disinfectant technology platform offering rapid, safe and effective disinfection across a range of industries from healthcare to education establishments to agriculture to water treatment to food processing.

The TECcare® ULTRA technology platform is based on a peracid with an adjuvant effect to enhance its antimicrobial efficacy. Peracids produce destructive hydroxyl free radicals which are strong oxidising agents.

The antimicrobial mechanism of action for TECcare® ULTRA is similar to other high level (sporicidal) disinfectants such as peracetic acid and hydrogen peroxide whose primary mechanism of action is also achieved by oxidation as a result of the production of hydroxyl free radicals.[1,2]

What has TECcare® ULTRA been designed for?

TECcare® ULTRA has been developed for very high level disinfection of all hard and soft surfaces, environments, equipment and air. It is designed for use in situations where there is a clear need to reduce the bioburden (i.e. number of microbes present) to the lowest possible level in order to interrupt key transmission pathways (surfaces and air) and reduce the risk of infection, cross infection, contamination, spoilage etc.

TECcare® ULTRA is a disinfectant and not a cleaner, therefore it is designed to be used as the second stage (the disinfection stage) of a two stage cleaning (stage 1) and disinfection (stage 2) protocol.

Products from the TECcare® ULTRA range

How does TECcare® ULTRA affect microbes?

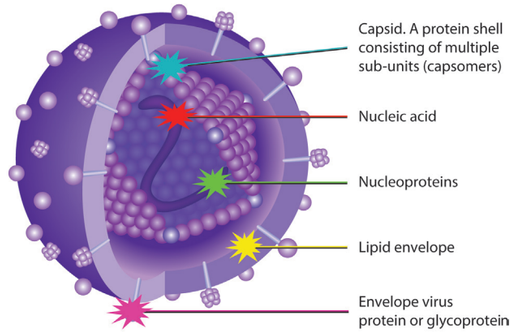
It is the hydroxyl free radicals produced by TECcare® ULTRA which are responsible for its potent antimicrobial activity (see Figure 1). Hydroxyl free radicals have multiple points of action on microbes which include:-

- Attacking membrane lipids [1-4]
- Breaking apart nucleic acids (DNA and RNA) [1-4]
- Denaturing proteins [1, 3]
- Disrupting cell wall permeability [1, 3]
- Oxidation of sulfhydryl and sulphur bonds in proteins, enzymes and other metabolites [1, 3]

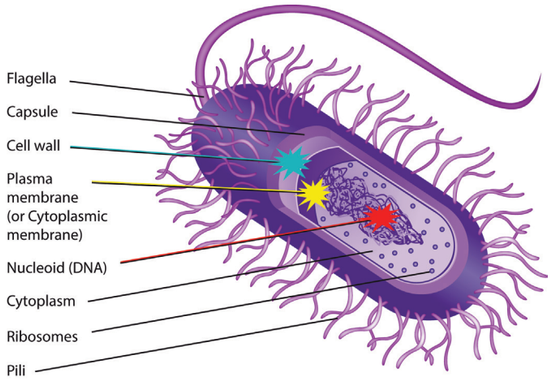
Proteins, lipids and nucleic acids are essential components of bacteria, viruses, fungi and bacterial spores. Significant damage to one or more of these components is often fatal for the microbe.

The destructive nature of hydroxyl free radicals coupled with multiple points of action result in TECcare® ULTRA having a lethal effect on microbes within seconds / minutes of initial contact (see Table 1).

Figure 1. Schematic diagram highlighting the key bacterial and viral structures affected by TECcare® ULTRA



Virus



Bacterial cell

How effective is TECcare® ULTRA against micro-organisms?

TECcare® ULTRA is an ultra-high level, broad spectrum disinfectant which is effective against all microbial classes up to and including bacterial spores. See Table 1 for a summary of the microbial classes and the results of extensive in-vitro testing performed at independent, accredited laboratories.

TABLE 1. Antimicrobial efficacy of TECcare® ULTRA

MICROBIAL CLASS	ANTIMICROBIAL EFFICACY TEST*	CONTACT TIME (MINUTES)	LOG REDUCTION
BACTERIA (Gram-positive/Gram-negative)	EN 1276 [5]	1	>5
	AOAC - Bactericidal [6]	1	>6
VIRUSES (enveloped and non-enveloped)	EN 14476 [7]	5	>4
	AOAC - Virucidal [8]	5	>4
FUNGI	EN 1650 [9]	1	>5
	AOAC - Fungicidal [10]	5	>6
BACTERIAL SPORES	EN 13704 [11]	1	>6
	AOAC - Sporicidal [12]	5	>6
MYCOBACTERIA	EN 14563:2008 [13]	5	>4

* All testing was performed using hard water and under dirty conditions in order to present the toughest challenge to the TECcare® ULTRA technology platform.

TECcare® ULTRA gives a greater than Log 6 reduction in *C. difficile* spores within a 1 minute contact time when used with hard water and under 'dirty' conditions. [11]

Key features of the TECcare® ULTRA technology platform

In addition to the highest levels of antimicrobial efficacy, TECcare® ULTRA is fragrance free, chlorine free, alcohol free and exhibits the following key qualities when in use; non-corrosive, non-irritant, non-toxic, food safe, safe in use, cost effective, degrades/ decomposes into safe by-products after use (water and oxygen), easy to use, excellent levels of user acceptance with a prolonged antimicrobial effect and excellent materials compatibility. (See technology comparison table on back cover.)

What is the TECcare® CONTROL technology platform?

TECcare® CONTROL is a high level disinfectant technology platform offering safe, effective, user friendly single step cleaning and disinfection across a wide range of industries from healthcare to educational establishments to food processing to veterinary science.

The TECcare® CONTROL technology platform is based around the quaternary ammonium compounds didecyldimethyl ammonium chloride (DDAC) and benzalkonium chloride (BAC) with an adjuvant effect to enhance its antimicrobial efficacy.

The advanced chemistry behind the TECcare® CONTROL technology platform has resulted in the production of a 6th generation quaternary ammonium compound (QAC). NB. QAC based disinfectants are typically categorised according to their 'generation', with increasing antimicrobial activity generally being demonstrated as you ascend the generations i.e. 1st generation QACs demonstrate the lowest level of antimicrobial activity, with 5th generation QACs offering outstanding levels of antimicrobial activity. [2] With BAC and DDAC categorised as 1st and 5th generation QACs respectively the adjuvant effect elevates TECcare® CONTROL to be positioned as a 6th generation QAC.

What has TECcare® CONTROL been designed for?

TECcare® CONTROL has been developed as a combined high level disinfectant / cleaner for all hard and soft surfaces, environments, equipment and air. It is designed for use in situations where there is a clear need to create and maintain the cleanest possible environment whilst simultaneously reducing the bioburden (i.e. number of microbes present) in order to interrupt the key transmission pathways (surfaces and air) and reduce the risk of infection, cross infection, contamination, spoilage etc.

As a combined disinfectant cleaner TECcare® CONTROL is intended for single stage cleaning and disinfection protocols. If local policy dictates a two-stage clean, then disinfect, process then TECcare® CONTROL is suitable for either stage of this process.

Products from the TECcare® CONTROL range

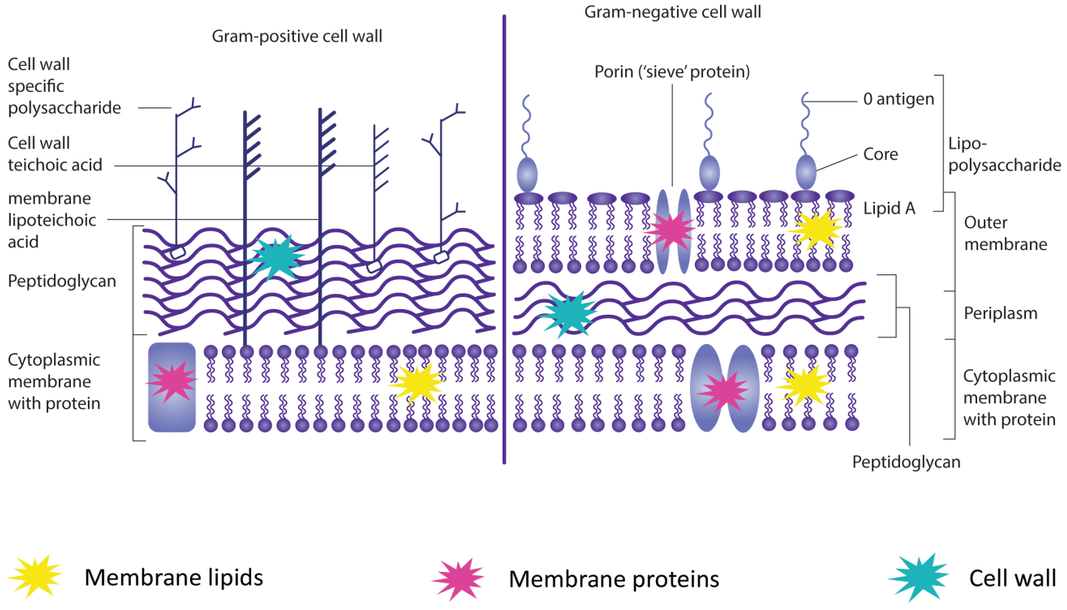
How does TECcare® CONTROL affect microbes?

TECcare® CONTROL is a powerful lytic agent which is based on the quaternary ammonium compounds benzalkonium chloride and didecyldimethyl ammonium chloride. Quaternary ammonium compounds have multiple affects and points of action within the microbe (see Figure 2) which include:-

- Inactivation of energy-producing enzymes [1, 2, 14]
- Denaturation of essential microbial proteins [1, 2, 15]
- Physical disruption of membrane lipids [1, 14]
- Bacterial cell walls [3, 16-18]

Proteins and lipids are essential components of bacteria, viruses, fungi and bacterial spores. Significant damage to these key microbial components is often fatal for the organism. TECcare® CONTROL causes rapid and significant changes at multiple sites within the microbe. The magnitude of this affect is so great that it is typically lethal to the microbe within minutes of contact (see Table 2).

Figure 2. Schematic diagram highlighting the key bacterial structures affected by TECcare® CONTROL



How effective is TECcare® CONTROL against micro-organisms?

TECcare® CONTROL is a high level, broad spectrum disinfectant cleaner which is effective against all microbial classes up to and including bacterial spores. See Table 2 for a summary of the microbial classes and the results of extensive in-vitro testing performed at independent, accredited laboratories.

TABLE 2. Antimicrobial efficacy of TECcare® CONTROL

MICROBIAL CLASS	ANTIMICROBIAL EFFICACY TEST*	CONTACT TIME (MINUTES)	LOG REDUCTION
BACTERIA (Gram-positive/ Gram-negative)	EN 1276 [19]	1	>6
	AOAC - Bactericidal [20]	10	>6
VIRUSES (enveloped and non-enveloped)	EN 14476 [21]	5	>4
	AOAC - Virucidal [22]	5	>4
FUNGI (mould and yeast)	EN 1650 [23]	1	>5
	AOAC - Fungicidal [24]	10	>6
BACTERIAL SPORES	EN 13704 [25]	60	>3
MYCOBACTERIA	EN 14348 [26]	1	>5

TECcare® CONTROL gives a greater than Log 3 reduction in *C. difficile* spores within a 60 minute contact time when used with hard water and under 'dirty' conditions. [25]

In general, quaternary ammonium compounds are not recognised sporicides. [3] However, DDAC is a highly effective biocide [15] and one specific DDAC product has previously demonstrated very high levels of sporicidal activity, in line with chlorine dioxide disinfectants. [27]

* All testing was performed using hard water and under dirty conditions in order to present the toughest challenge to the TECcare® CONTROL technology platform.

Key features of the TECcare® CONTROL technology platform

In addition to very high levels of antimicrobial efficacy, TECcare® CONTROL is fragrance free, chlorine free, alcohol free and exhibits the following key qualities when in use; non-corrosive, non-irritant, non-toxic, food safe, safe in use, cost effective, excellent levels of user acceptance with a prolonged antimicrobial effect and excellent materials compatibility. (See technology comparison table on back cover.)

Products from the TECcare® CONTROL range

What is the TECcare® PROTECT technology platform?

TECcare® PROTECT is a disinfectant / antiseptic technology platform. It is intended for use as a skin antiseptic and offers safe, effective, user friendly skin cleansing, disinfection and sanitation across a wide range of industries from healthcare to educational establishments, to food processing to veterinary science.

The TECcare® PROTECT technology platform is based around the quaternary ammonium compound benzalkonium chloride (BAC) with an adjuvant effect to enhance its antimicrobial efficacy.

Whilst benzalkonium chloride is a 1st generation QAC (typically associated with the lowest level of antimicrobial activity) [2] the adjuvant effect will significantly increase antimicrobial activity [28] above and beyond the performance that would otherwise be expected from the base QAC chemistry.

What has TECcare® PROTECT been designed for?

TECcare® PROTECT has been developed as a skin sanitiser for use in situations where skin and hand hygiene are of paramount importance. TECcare® PROTECT will interrupt the key transmission pathway of the hands (skin) by reducing the bioburden (i.e. number of microbes present) on the skin to its lowest possible level, thereby reducing the risk of infection, cross infection, contamination, spoilage etc.

In situations where effective hand washing is not possible TECcare® PROTECT offers a highly effective alternative.

Products from the TECcare® PROTECT range

How does TECcare® PROTECT affect microbes?

TECcare® PROTECT is a strong lytic agent based upon the quaternary ammonium compound benzalkonium chloride. Quaternary ammonium compounds have multiple affects and points of action within the microbe (see Figure 3) which include:-

- Inactivation of energy-producing enzymes [1, 2, 14]
- Denaturation of essential microbial proteins [1, 2, 15]
- Physical disruption of membrane lipids [1, 14]
- Bacterial cell walls [3, 16-18]

Proteins and lipids are essential components of bacteria, viruses, and fungi. Significant damage to these key microbial components is often fatal for the organism. TECcare® PROTECT causes rapid and significant changes at multiple sites within the microbe. The magnitude of this affect is so great that it is typically lethal to the microbe within minutes of contact (see Table 3).

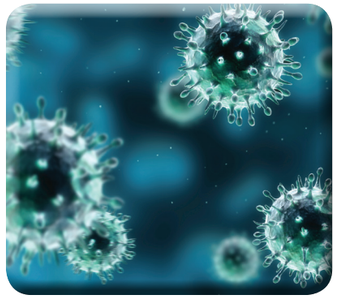
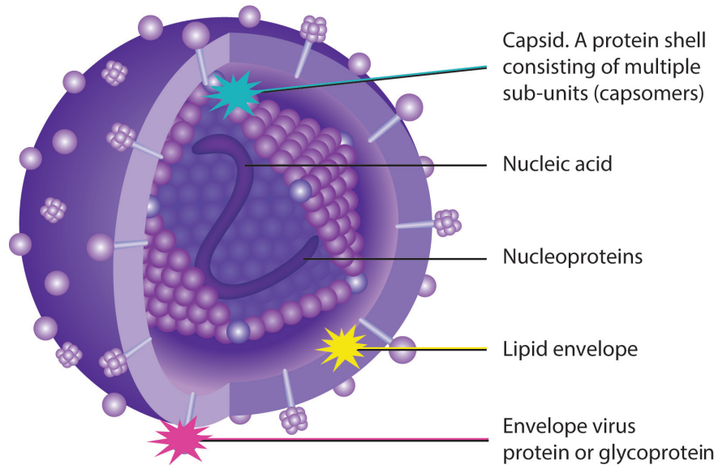


Figure 3. Schematic diagram highlighting the key viral structures affected by TECcare® PROTECT



How effective is TECcare® PROTECT against micro-organisms?

See Table 3 for a summary of the microbial classes and the results of extensive in-vitro testing performed at independent, accredited laboratories.

MICROBIAL CLASS	ANTIMICROBIAL EFFICACY TEST*	CONTACT TIME (SECONDS)	LOG REDUCTION
BACTERIA (Gram-positive/Gram-negative)	FDA Monograph [29]	15	>5
BACTERIA (*E. coli*)	EN 1500 [30]	15	>3
BACTERIA (*E. coli*)	EN 1499:2013 [31]	60	Exceeds test specification
VIRUSES (enveloped and non-enveloped)	EN 14476 [32]	60	>3
FUNGI	AOAC - Fungicidal [33]	15	>5

TABLE 3. Antimicrobial efficacy of TECcare® PROTECT

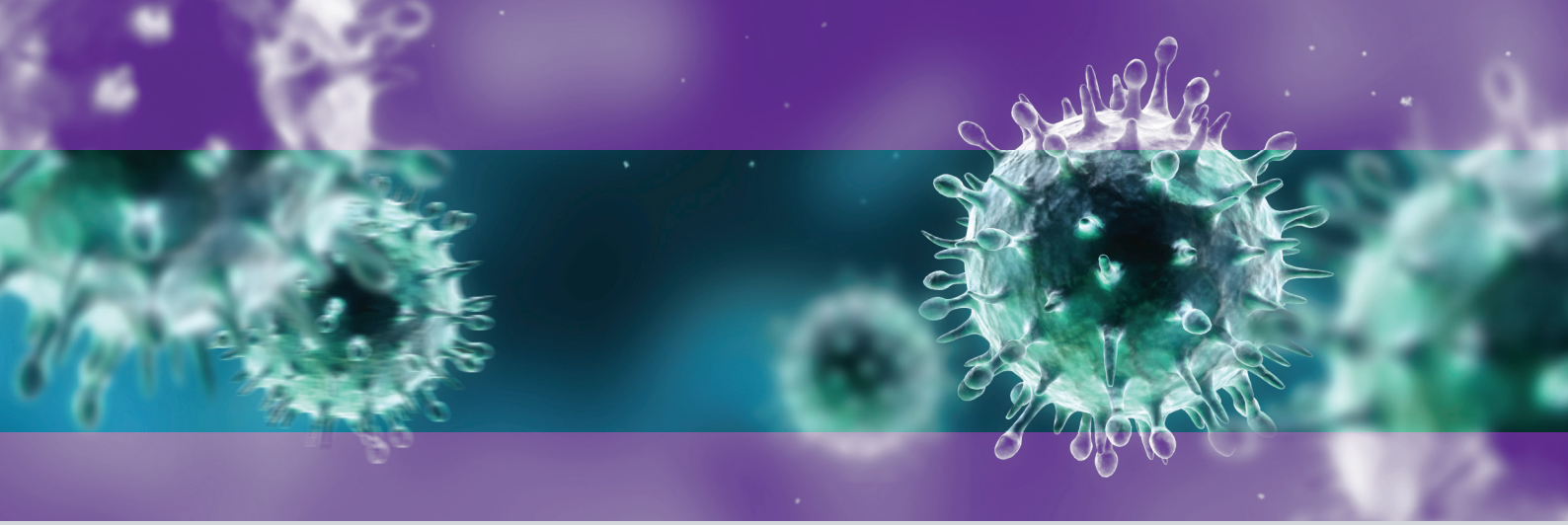
* With the exception of EN1500 all testing was performed using hard water and under dirty conditions in order to present the toughest challenge to the TECcare® PROTECT technology platform.

Key features of the TECcare® PROTECT technology platform

In addition to high levels of antimicrobial efficacy TECcare® PROTECT is water based, alcohol free, simultaneously sanitises and moisturises the skin, and exhibits the following key qualities when in use: non-corrosive, non-irritant, non-toxic, non-flammable, food safe, safe in use, cost effective, easy to use with excellent levels of user acceptance and a prolonged antimicrobial effect for up to 2 hours after application. Furthermore it is also fragrance free and leaves no sticky residue, tackiness or odour on the hands or skin. (See technology comparison table on back cover.)

References

1. Rutala WA, Weber DJ and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Guideline for disinfection and sterilization in healthcare facilities, 2008. [homepage on the internet]; 2008. [cited 2013 Dec 10] Available from: http://www.cdc.gov/hicpac/pdf/guidelines/disinfection_nov_2008.pdf
2. Buck KM. Cleaning and disinfecting: The effects of germicides [homepage on the internet]. Infection Control Today. September 2001 [cited 2013 Dec 9]. Available from: http://www.infectioncontroltoday.com/articles/2001/09/infection-control-today-09-2001-the-effects-of-ge.aspx
3. McDonnell G, Russell AD. Antiseptics and disinfectants: activity, action, and resistance. Clin Microbiol Rev. 1999 Jan;12(1):147-79.
4. Finnegan M, Linley E, Denyer SP, McDonnell G, Simons C, Maillard JY. Mode of action of hydrogen peroxide and other oxidizing agents: differences between liquid and gas forms. J Antimicrob Chemother. 2010 Oct;65(10):2108-15.
5. Manchester University. EN1276 Chemical disinfectants and antiseptics – quantitative suspension test for the evaluation of bactericidal activity of chemical disinfectants and antiseptics used in food, industrial, domestic and institutional areas (Phase 2, Step 1). Manchester, UK. September 2007. Data on file, TECcare Antimicrobial Technologies.
6. ATS Labs. AOAC Bactericidal efficacy test. Eagan, MN, USA. November 2010. Data on file, TECcare Antimicrobial Technologies.
7. Manchester University. EN14476:2005 Chemical disinfectants and antiseptics – virucidal quantitative suspension test for chemical disinfectants used in human medicine (Phase 2, Step 1). Manchester, UK. February 2007. Data on file, TECcare Antimicrobial Technologies.
8. Bioscience Laboratories Inc. AOAC Virucidal efficacy test. Bozeman, Montana (MA) USA. June 2009. Data on file, TECcare Antimicrobial Technologies.
9. Manchester University. BS EN 1650 Chemical disinfectants and antiseptics – quantitative suspension test for the evaluation of fungicidal activity of chemical disinfectants and antiseptics used in food, industrial, domestic and institutional areas. Manchester, UK. March 2007. Data on file, TECcare Antimicrobial Technologies.
10. Bioscience Laboratories Inc. AOAC Fungicidal efficacy test. Bozeman, Montana (MA) USA. September 2009. Data on file, TECcare Antimicrobial Technologies.
11. BluTest Laboratories Ltd. Test Report: EN13704:2002 Chemical disinfectants – quantitative suspension test for the evaluation of sporicidal activity of chemical disinfectants used in food, industrial, domestic and institutional areas – (phase 2, step 1), modified. *Bacillus subtilis* and *Clostridium difficile*. Glasgow, UK. December 2011. Data on file, TECcare Antimicrobial Technologies.
12. ATS Labs. AOAC Sporicidal efficacy test. Eagan, MN, USA. November 2010. Data on file, TECcare Antimicrobial Technologies.
13. BluTest Laboratories Ltd. Test Report: EN14563:2008 Chemical disinfectants and antiseptics – quantitative carrier test for the evaluation of mycobactericidal or tuberculocidal activity for instruments used in the medical area – Test method and requirements (phase 2, step 2). Glasgow, UK. October 2011. Data on file, TECcare Antimicrobial Technologies.
14. Denyer SP, Stewart GSAB. Mechanisms of action of disinfectants. International Biodeterioration and Biodegradation 1998 Jan;41:261-8.
15. Gomi M, Osaki Y, Mori M, Sakagami Y. Synergistic bactericidal effects of a sublethal concentration of didecyldimethylammonium chloride (DDAC) and low concentrations of nonionic surfactants against Staphylococcus aureus. Biocontrol Sci. 2012;17(4):175-81.
16. Ioannou CJ, Hanlon GW, Denyer SP. Action of disinfectant quaternary ammonium compounds against Staphylococcus aureus. Antimicrob Agents Chemother. 2007 Jan;51(1):296-306.
17. Salton MR. Lytic agents, cell permeability, and monolayer penetrability. J Gen Physiol. 1968 Jul 1;52(1):227-52.
18. Maillard JY. Bacterial target sites for biocide action. J Appl Microbiol. 2002;92 Suppl:16S-27S.
19. Hospital Infection Research Laboratory. Efficacy tests (EN1276). EN1276 Chemical disinfectants and antiseptics – Quantitative suspension test for the evaluation of chemical disinfectants and antiseptics used in food, industrial, domestic and institutional areas (phase 2/step 1). Hospital Infection Research Laboratory, Birmingham, UK. February 2008. Data on file, TECcare Antimicrobial Technologies.
20. ATS Labs. AOAC Bactericidal efficacy test. Eagan, MN, USA. April 2008. Data on file, TECcare Antimicrobial Technologies.
21. BluTest Laboratories Ltd. Test Report: EN14476:2005 Chemical disinfectants and antiseptics – virucidal quantitative suspension test for chemical disinfectants and antiseptics used in human medicine - Test method and requirements (phase 2/ step 1) Modified for Feline calicivirus (Human Norovirus Surrogate). Glasgow, UK. November 2012. Data on file, TECcare Antimicrobial Technologies.
22. Bioscience Laboratories Inc. AOAC Virucidal efficacy test. Bozeman, Montana (MA) USA. January 2009. Data on file, TECcare Antimicrobial Technologies.
23. Manchester University. BS EN 1650 Chemical disinfectants and antiseptics – quantitative suspension test for the evaluation of fungicidal activity of chemical disinfectants and antiseptics used in food, industrial, domestic and institutional areas. Manchester, UK. March 2007. Data on file, TECcare Antimicrobial Technologies.
24. ATS Labs. AOAC Fungicidal efficacy test. Eagan, MN, USA. April 2008. Data on file, TECcare Antimicrobial Technologies.
25. BluTest Laboratories Ltd. Test Report: EN13704:2002 Chemical disinfectants – quantitative suspension test for the evaluation of sporicidal activity of chemical disinfectants used in food, industrial, domestic and institutional areas – (phase 2, step 1), modified. *Clostridium difficile* endospores. Glasgow, UK. November 2012. Data on file, TECcare Antimicrobial Technologies.
26. BluTest Laboratories Ltd. Test Report: EN14348:2005 Chemical disinfectants and antiseptics – quantitative suspension test for the evaluation of mycobactericidal activity of chemical disinfectants in the medical area including instrument disinfectants – test methods and requirements (phase 2, step 1). Glasgow, UK. December 2014. Data on file, TECcare Antimicrobial Technologies.
27. Speight S, Moy A, Macken S, Chitnis R, Hoffman PN, Davies A, Bennett A, Walker JT. Evaluation of the sporicidal activity of different chemical disinfectants used in hospitals against *Clostridium difficile*. J Hosp Infect. 2011 Sep;79(1):18-22.
28. Sattar S. Cleaning, disinfection and sterilisation. In Friedman C and Newsom W (Eds), IFIC Basic Concepts of Infection Control (2nd ed). [homepage on the internet]; 2011:167-84 [cited 2013 Dec 17]. Available from: http://www.theific.org/basic_concepts/chapter12.pdf
29. FDA Monograph. (59 FR 31402) 21 CFR Parts 333 and 369 Tentative Final Monograph for Health-Care Antiseptic Drug Products. Data on File, TECcare Antimicrobial Technologies.
30. Manchester University. Chemical disinfectants and antiseptics hygienic hand rub. Efficacy Tests BS EN 1500:1997 Test method and requirements (phase 2, step 2). Manchester, UK. Oct 2009. Data on file, TECcare Antimicrobial Technologies.
31. Manchester University. Chemical disinfectants and antiseptics. Hygienic handwash. Efficacy Tests BS EN 1499:2013 Test method and requirements (phase 2, step 2). Manchester, UK. Data on file, TECcare Antimicrobial Technologies.
32. Manchester University. EN14476:2005 Chemical disinfectants and antiseptics – virucidal quantitative suspension test for chemical disinfectants used in human medicine (Phase 2, Step 1). Manchester, UK. February 2007. Data on file, TECcare Antimicrobial Technologies.
33. ATS Labs. AOAC Fungicidal efficacy Test. Eagan, MN, USA. April 2009. Data on file, TECcare Antimicrobial Technologies.



TECcare ANTIMICROBIAL TECHNOLOGY PLATFORMS - AT A GLANCE

TECHNOLOGY ATTRIBUTES / FEATURES			TECcare ULTra	TECcare CONTROL	TECcare PROTECT
TRANSMISSION PATHWAYS	Environmental surfaces		●	●	
	Air		●	●	
	Hands / skin				●
ANTIMICROBIAL EFFICACY	EN test certificates	EN 1500 (Bactericidal)			●
		EN 1499:2013 (Bactericidal)			●
		EN 1276 (Bactericidal)	●	●	
		EN 14476 (Virucidal)	●	●	●
		EN 1650 (Fungicidal)	●	●	
		EN 13704 (Sporicidal)	●	●	
		EN 14563 / EN 14348 (Mycobactericidal)	●	●	
	AOAC test certificates	Bactericidal	●	●	
		Virucidal	●	●	
		Fungicidal	●	●	●
		Sporicidal	●		
	FDA monograph (bacteria)				●
KEY FEATURES	Non-corrosive		●	●	●
	Non-irritant		●	●	●
	Non-toxic		●	●	●
	Non-flammable		●	●	●
	Safe in use		●	●	●
	Prolonged antimicrobial effect		●	●	●
	Fragrance free		●	●	●
	Food safe		●	●	●
	Decomposes into oxygen and water after use		●		
	No loss in efficacy over time		●	●	●
	No residue		●	●	●
	Chlorine free		●	●	●
	Alcohol free		●	●	●
	Excellent materials compatibility		●	●	*n/a*
	All in-vitro testing performed in accredited laboratories		●	●	●
USES	Disinfection		●	●	
	Cleaning			●	
	Hand and skin hygiene				●
APPROVALS / REGISTRATIONS / COMPLIANCE	REACH Regulations		●	●	●
	CE marked		●	●	●
	OSHA		●	●	●
	ASTM Corrosion Testing			●	●

TECcare® Antimicrobial Technologies

TECcare
Lymington
SO41 8JD

Great British Products

www.TECcare.com

sales@TECcare.com

Tel. 0845 226 9394