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Anti-Microbial Copper Films
that destroy microbes within minutes!

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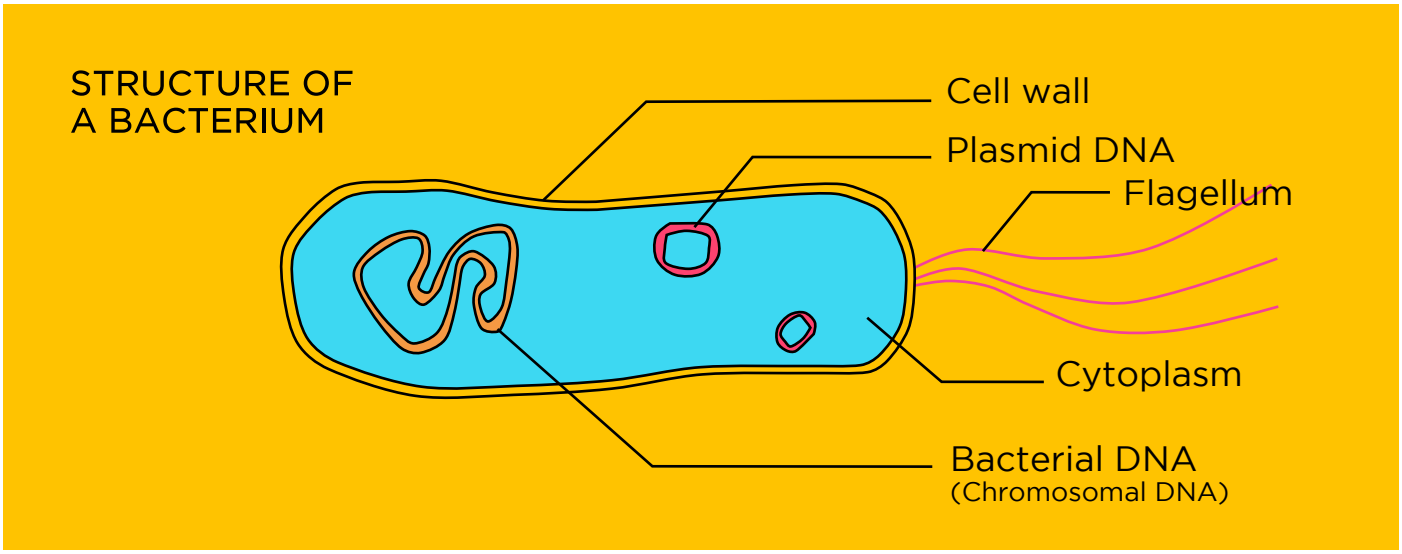
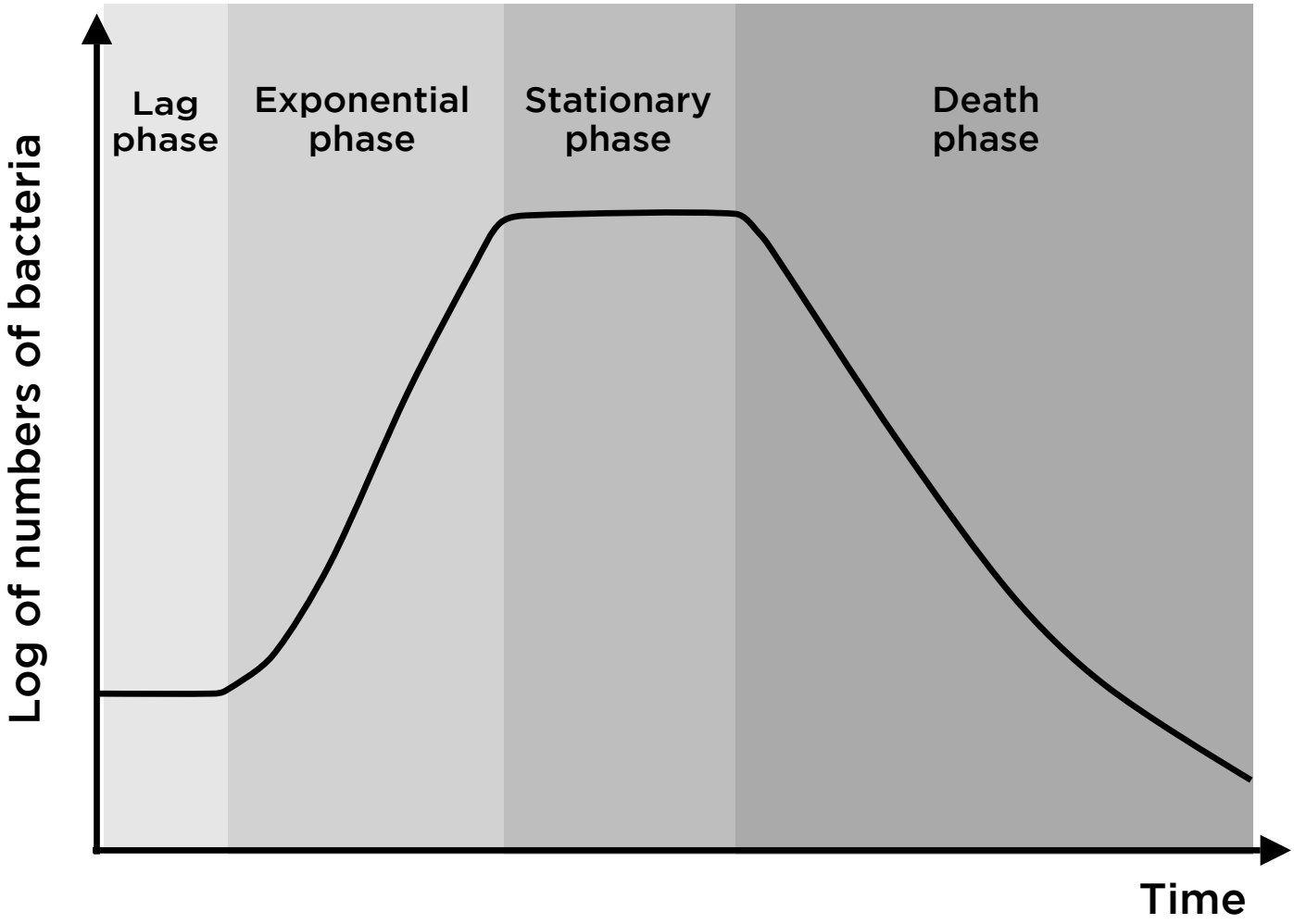
An Introduction to Microbes

Microbes are tiny living things (microorganisms) that are found all around us and are too small to be seen with the naked eye. They live in water, soil, and in the air.

Some microbes make us sick, others are important for our health. The most common types are bacteria, viruses and fungi.



Bacteria replicates rapidly in the right conditions (temperature, humidity, acidity and oxygen). Through a process known in the scientific world as "Binary Fission", bacteria replicate their DNA, grow, and then split into two separate cells. This process continues, growing the number of bacteria on a surface exponentially over time. Theoretically, this could continue forever, but practically there are changes in temperature, humidity or acidity levels that eventually slow the growth of a bacteria down.



One highly effective Anti-Microbial material is Copper (Cu)

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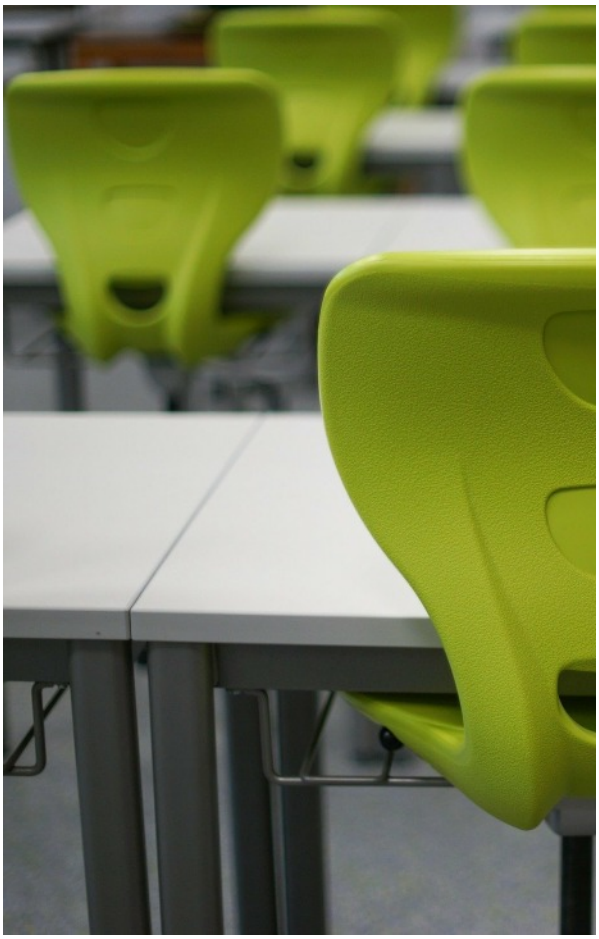
Copper vs Microbes

Plain copper has anti-microbial properties, and this isn't a recent discovery by any means. In fact, the ancient Egyptians, Greeks and others used it to carry and store water because they could tell just by observation that copper kept the water free from spoilage.

However, with modern technologies, scientists have now discovered far more uses for copper than the ancient Egyptians ever would have dreamt of!

But before we get into that, this is how copper kills microbes...



When copper oxidizes, it binds copper atoms to oxygen atoms, which constantly exchange electrons to stabilise. This disrupts organisms at a microscopic level and kills off microorganisms that cause illness and disease. It pulls electrons out of its cell wall lipids, oxygen or proteins. This weakens the cell wall enough to cause it to break, which eventually kills the bacteria.

Oxidizing copper releases highly reactive atoms of oxygen hydroxide which are trying to steal electrons from surrounding molecules to be stable. However, while it's doing this, it sets off a destructive chain reaction which ruptures the cells membrane and ultimately kills the bacteria.

With it's cell walls broken, the bacteria attempts to adapt to its surroundings, and copper ions flood into the cell. Copper is quickly toxic to the inside of the cell, damaging its energy production and DNA-making parts. This prevents the bacteria from replicating.

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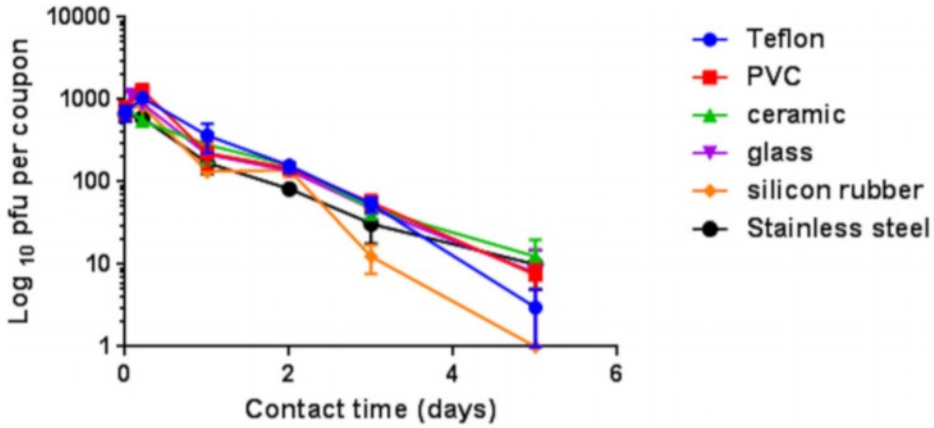
Does Copper work against COVID-19?

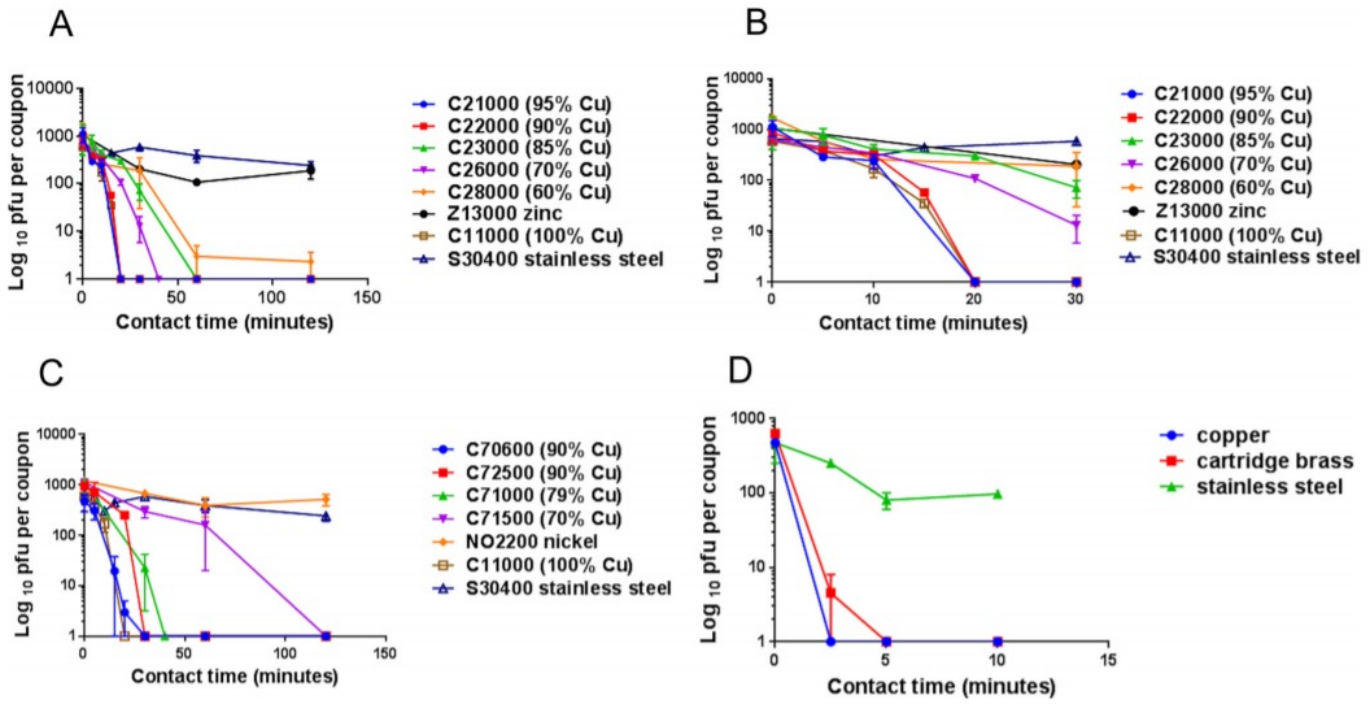
How COVID-19 reacts on Copper is something that hasn't been tested yet, but thanks to research conducted by the University of Southampton in 2015, we know that copper destroys similar coronaviruses. This is what their research concluded:

"Rapid inactivation, irreversible destruction of viral RNA, and massive structural damage were observed in coronavirus exposed to copper and copper alloy surfaces. Incorporation of copper alloy surfaces in conjunction with effective cleaning regimens and good clinical practise could help control transmission of respiratory coronaviruses, including MERS and SARS."

Warnes SL, Little ZR, Keevil CW. 2015. Human coronavirus 229E remains infectious on common touch surface materials. mBio 6(6):e01697-15. doi:10.1128/mBio.01697-15

This graph shows the persistence of infectious human coronavirus on common surface materials.





The graphics above show the rapid inactivation of human coronavirus that occurs on brass and copper nickel surfaces. The C references are all copper alloys and show the % of copper contained in them.

Warnes SL, Little ZR, Keevil CW. 2015. Human coronavirus 229E remains infectious on common touch surface materials. mBio 6(6):e01697-15. doi:10.1128/mBio.01697-15

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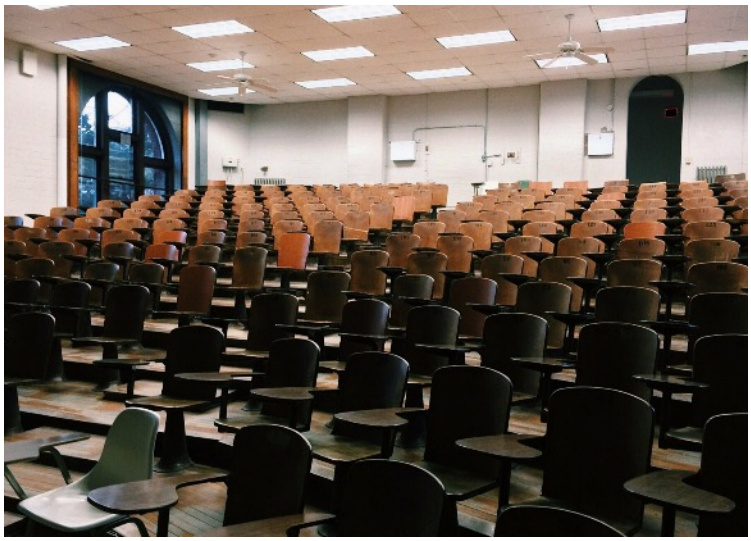
SteriMax Anti-Microbial Copper Film 150mic

SteriMax Anti-Microbial Copper Film is designed for application to high traffic touchpoints such as handles, railings, buttons and screens and can be used indefinitely depending on the level of wear and tear.



It is constantly exterminating and preventing the spread of harmful microbes, and yet is harmless to humans, and to the environment.

This 150mic film, comes in an adhesive and non-adhesive version.

Non Adhesive

Composition	Copper (CAS No. 7440-50-8) and Polyolefin (CAS No. 9002-88.4)	
Thickness	150mic	
Weight	138gsm	
Tensile Strength at Break, MD	130Mpa	ASTM D638
Elongation (%)	500	ASTM D638
Tensile Modulus	0.8	ASTM D638

Adhesive

Composition	Copper (CAS No. 7440-50-8) and Polyolefin (CAS No. 9002-88.4)	
Film Thickness	150mic	
Removable Adhesive Thickness	20-25mic	
Release Liner Thickness	160mic	
Tensile Strength at Break, MD	130Mpa	ASTM D638
Elongation (%)	500	ASTM D638
Tensile Modulus	0.8	ASTM D638

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Certifications & Tests

Strain	Reduction in bacteria as a %	Logarithmic decrease
Escherichia coli ATCC 8739	99.86	>2.86
MRSA (ATCC 43300)	99.85	>2.81

*Test reports are available on request

BioLabTests
Unit 3 Parade Court
Central Boulevard, Prologis Park
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Issue 4 – 02.03.2020
B-Lab-For-009a

Certificate of Analysis

Customer Name: INNOTECH
Customer Contact: Phil Walker
Customer Email/Phone:
Certificate Number: BL022/2020

Date Received: 15.04.2020
Date Analysed: 28.04.2020
Date Reported: 30.04.2020

Tick box if customer has provided untreated control samples for inclusion in testing ☐

Test Method: Determination of Antibacterial Activity using Test Based on MOD ISO 22196: 2011

BioLabTests Sample Reference Number	Sample	Test Bacteria	Contact Time* 0 Hrs	Contact Time* 24 Hrs	Reduction against Initial Log_{10}	Reduction against Initial %
200/208	STERIMAX ANTI-MICROBIAL COPPER FILM	MRSA	6.52×10^4	≤100	≥2.81	≥99.85%
		E. coli	7.26×10^4	≤100	≥2.86	≥99.86%

*Numbers represent Colony Forming Units at representative contact times.
Data show the changes in size of the initial MRSA (ATCC® 43300™) and *E. coli* (ATCC®8739™) populations due to their contact with the treated surface of the samples. The samples detailed in this CoA were tested for 24 hours (±1) at 35°C (±2) under a relative humidity of >90% as specified in the ISO 22196 method. The results detailed in this CoA relate only to the items tested. This certificate shall not be reproduced except in full, without written approval of BioLabTests.

Please note; sample was received in a ready to test state from the customer apart from sterilisation which is noted below.
All testing is performed on site at the BioLabTests address above unless otherwise disclosed.

BioLabTests
Unit 3 Parade Court
Central Boulevard, Prologis Park
Coventry, CV6 4QL
United Kingdom

Tel: +44 (0) 333 240 8308
Fax: +44 (0) 2476 338081
info@biolabtests.com
www.biolabtests.com

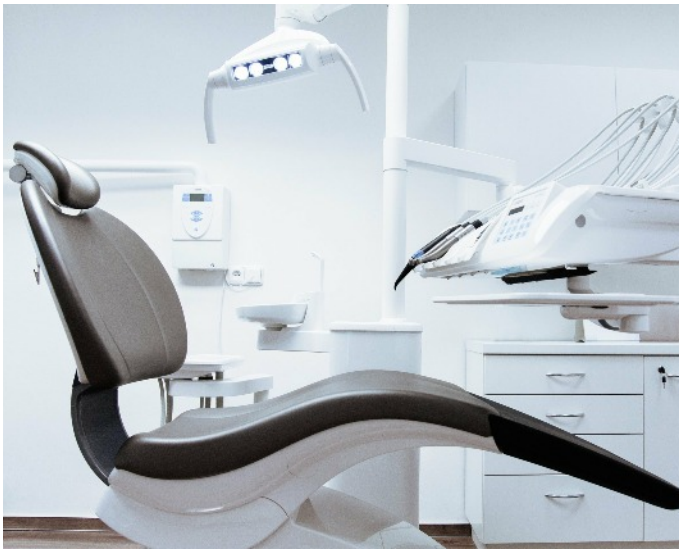
Noted during testing	
	Note
No. of samples supplied per test:	**6 of 6 supplied**
Sample size:	**Average size: 50 x 50mm**
Sample sterilisation method:	**DRY HEAT AT 65°C FOR ONE HOUR**
Film size:	**Average size: 40 x 40mm**
Inoculation volume:	**Volume: 0.08ml**
Initial bacterial concentration:	**MRSA: 8.15 x10^5 CFU/ml** ***E. coli*: 9.08 x10^5 CFU/ml**

The material of the cover slips is polyethylene with a thickness of 0.045mm.
Please note – For all information regarding deviations from ISO22196:2011, please request statement B-Lab-State-007

Ria Warren BSc (Hons), MRes
Quality Manager,
BioLabTests Ltd

END OF REPORT

Applications



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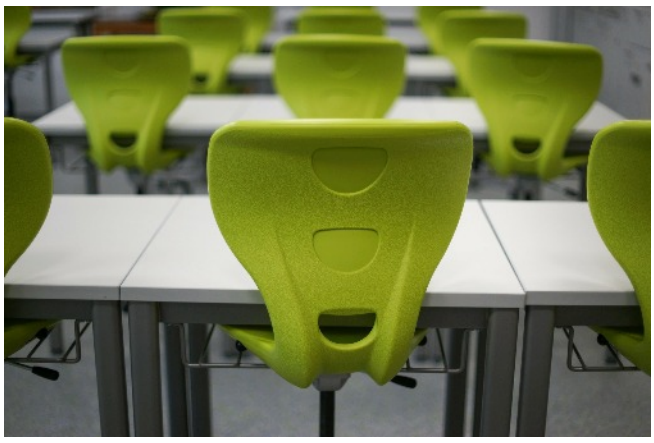


NCR

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