Keeping surfaces safe with

GUARDTEC Antimicrobial

Technology

Tested by SGS Testing Control Services Singapore Pte Ltd

YOUR HEALTH, OUR PRIORITY

Taking good care of our health is exceptionally important these days as microbes and bacteria could easily harm our bodies. Microbes and bacteria causes harmful effects to the body, some of which are skin allergies and respiratory problems. By having our floor and wall surfaces clean, it minimises the spread of these bacteria and safeguards our health. Introducing GuardTec, the latest antimicrobial protection for surfaces, keeping living spaces around us safe and protected.

GUARDTEC
ANTIMICROBIAL PROTECTION

GuardTec's antimicrobial coating for tiles can keep living spaces free of microbes and bacteria. It not only adds value to homes and buildings but also protects the environment that people spend most of their time in. Be it in homes, offices, schools or even the most hygiene critical environments like hospitals, elder care centres and child care centres, GuardTec enhances your well-being with an antimicrobial protection that lasts.

Start creating a healthy and comfortable environment for yourself and those around you, away from bacteria, odours and germs.

GuardTec's effectiveness

GuardTec is tested and proven to effectively kill up to 99.9% of bacteria and microorganisms. Antibacterial solutions only actively get rid of bacteria while Antimicrobial solutions such as GuardTec kills bacteria, fungi, algae and certain "micro- animals" such as house dust mites.

GuardTec can effectively eradicate the following microbes

+ Bacillus megaterium
+ Sarcina lutea
+ Pseudomonas aeruginosa
+ Pseudomonas vulgaris
+ Aspergilus niger
+ Staphylococcus aureus
+ Escherichia coli
+ Klebsiella pneumoniae
+ Candida albicans

SGS
ANTIMICROBIAL TESTED
Kills up to 99.9% of bacteria and microbes
Test report No: 10501305/20
ISO 22196:2011
Tested by SGS Testing Control Services Singapore Pte Ltd

Test of antimicrobial activity with reference to ISO 22196:2011

	GuardTec Tile	Control Sample
Artificial contamination of surface (cells/mL)	6.9 x 10^5	6.9 x 10^5
Arithmetic average of the numbers of bacteria (cells/cm^2) after 24 hours	3.8 x 10^1	3.9 x 10^5
Antibacterial activity rate (%)	>99.9	-

GUARDTEC FOR ALL

GuardTec for Businesses

GuardTec's antimicrobial protection for floor and wall tiles are recommended in all environments where cleanliness, hygiene and sanitation is vital.

Healthcare
Hospitals, Hospices, Elder care facilities

Food & Beverage
Restaurants, Hotel kitchens, Food processing and manufacturing facilities

Early Childhood
Childcare centres, Schools, Kids recreational facilities

High traffic areas
Hair and nail salons, Spas, Massage parlours, Gyms

GuardTec for Homes

Not forgetting our homes, our sanctuary where we unwind and relax after a long day at work. It is important to provide comfort and build a place we can feel safe. With that, GuardTec was formulated to safeguard and protect our loved ones at home. It remains active as long as the tile lasts, giving you protection all year round. With our wide range of tile designs coated with GuardTec, you need not worry about compromising style with safety as our technology does not affect the look and texture of the tile.

Suitable for all homes even those with

Babies
Allow unlimited exploration for your little one with GuardTec. Our antimicrobial surfaces take your worries away by ensuring a clean and hygienic space for them to explore.

Elderly
The elderly need our utmost care due to weaker immune systems. GuardTec keeps your surfaces free from bacteria and microbes.

Pets
Pets may sometimes bring unwanted germs or bacteria into our homes. GuardTec can help you keep your home clean and odour free.

GuardTec's Benefits

Kills Bacteria
The presence of bacteria is common and contamination can occur easily if we do not practice proper hygiene in areas we live in. GuardTec inhibits the growth of bacteria on floor and wall tiles, providing a cleaner living space for all.

Purifies Air
Nano Zinc Oxide (ZnO) present in GuardTec's technology has the ability to absorb harmful air particles via its ROS process. This purifies the air we breathe and prevents any adverse health effects.

Deodorizing
Unpleasant smell arise due to the presence of high fatty acids in the environment. GuardTec helps convert these fatty acids into water insoluble, non-volatile salts. This in turn deodorises and enhances the scent around your environment.

Safe
Nano Zinc Oxide (ZnO) is a common ingredient found in many daily products we use and consume. From breakfast cereals, baking flour, cosmetic products, lotions and soaps, Nano Zinc Oxide (ZnO) is known for its positive effects on general health.

OUR NANO ZINC OXIDE (ZnO) TECHNOLOGY

Using the latest Nano Zinc Oxide (ZnO) Technology for surfaces

Metal and metal oxides are the most well known compounds to destroy bacteria.

GuardTec's technology uses Nano Zinc Oxide (ZnO) that is highly effective and affordable to inhibit the growth of bacteria on surfaces. With GuardTec, we ensure that surfaces retain their original colour and do not leave any colour tint. Our innovation leaves a permanent bacteria-killing effect that gives any surface a timeless protection without wear and tear.

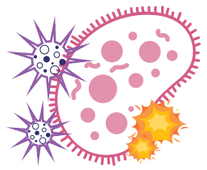
Other common metal oxides with antimicrobial properties

+ Silver (Ag) + Titanium Oxide (TiO_2) + Iron Oxides (Fe_3O_4) + Copper Oxide (CuO)

How Nano Zinc Oxide (ZnO) destroys bacteria

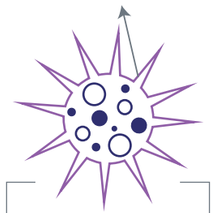
Nano Zinc Oxide (ZnO) disrupts bacteria cell membrane and penetrates bacteria cell via diffusion.

The wing like surface of Nano Zinc Oxide (ZnO) is covered with needle like Nano pillar.



When bacteria contact these surfaces, the membrane of the cells expand causing a production of sugar, DNA and protein, thus effectively killing bacteria.

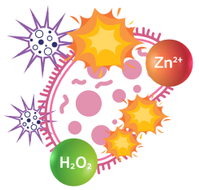
Wing surface



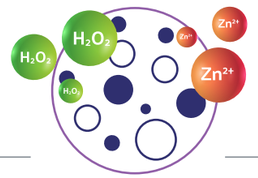
Nano Zinc Oxide (ZnO) Particle

Process A

Nano Zinc Oxide (ZnO) kills bacteria cells and microorganisms in 2 ways



Process B



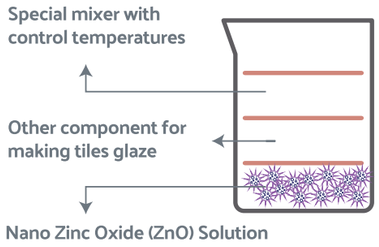
Hydrogen peroxide (H_2O_2) + zinc ion (Zn^{2+}) will also enter the cell membrane, thus killing the cell.

Zinc is a reactive oxygen species (ROS) that generate superoxide, hydrogen peroxide (H_2O_2) and zinc ion (Zn^{2+}) during mitochondrial electron transport and metal catalytic oxidation.

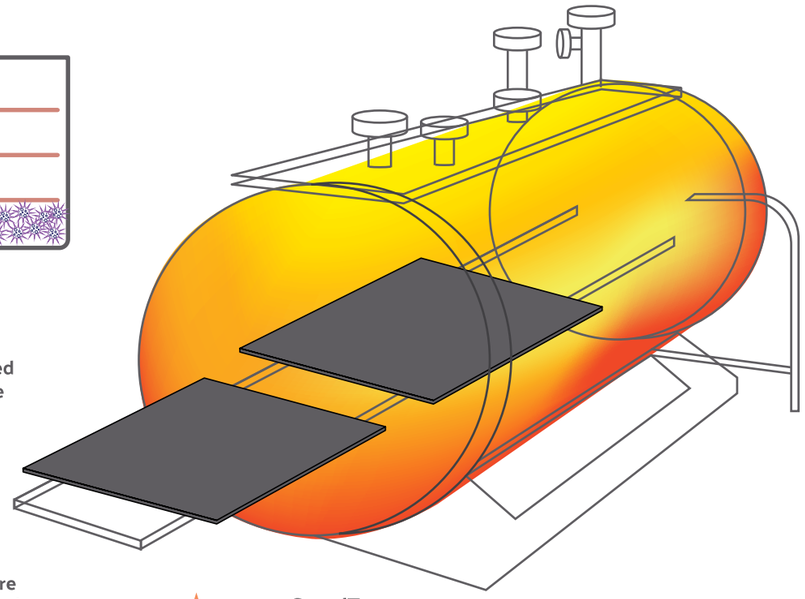
Benefits of using Nano Zinc Oxide (ZnO)

- Non-toxic
- Biosafe
- No colour tinting
- Commonly used in food and baby products
- Most affordable compared to other metal oxides

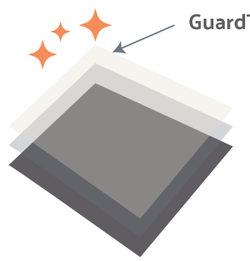
How it is applied



STEP 1 GuardTec + Glaze
GuardTec's key compound, Nano Zinc Oxide (ZnO) is integrated into our specially formulated glaze before firing.



STEP 2 Firing
Once the glaze is fired, the entire tile surface is permanently sealed with an antimicrobial protection.



STEP 3 Shape, Studio, Space Tile design
GuardTec kills bacteria and impurities before they reach the tile surface, thus preventing the spread of germs and bacteria.

TEST REPORT

SGS

Test Report No. 10501305/20 Date: 26-Oct-2020 Page 2 of 3

Sample Description :

Specimen No.	Description
1	Block Sample

Test Result(s) :

Test Requested : Test of antimicrobial activity

Test Method : With reference to ISO 22196:2011 Measurement of antibacterial activity on plastics and other non-porous surfaces

Test organism(s)	MRSA ATCC 33591	Staphylococcus aureus ATCC 6538
Concentration of bacteria (cells/mL)	6.9x10^5	6.4x10^5
Volume of test inoculum (mL)	0.2	0.2
U_0	3.82	3.93
Ut	5.59	5.83
At	1.58	3.69
B (cells/cm²)	3.9x10^5	6.7x10^5
C (cells/cm²)	3.8x10^1	4.9x10^3
R	4.0	2.1
*The antibacterial activity rate (%)	>99.9	99.3

Test organism(s)	Klebsiella pneumoniae ATCC 4352
Concentration of bacteria (cells/mL)	8.3x10^5
Volume of test inoculum (mL)	0.2
U_0	4.04
Ut	5.73
At	2.36
B (cells/cm²)	5.4x10^5
C (cells/cm²)	2.3x10^2
R	3.4
*The antibacterial activity rate (%)	>99.9

SGS

Test Report No. 10506067(2)/20 Date: 24-Dec-2020 Page 2 of 3

Sample Description :

Specimen No.	Description
1	Block Sample

Test Result(s) :

Test Requested : Test of antimicrobial activity

Test Method : With reference to ISO 22196:2011 Measurement of antibacterial activity on plastics and other non-porous surfaces

Test organism(s)	Escherichia Coli ATCC 8739	Candida albicans ATCC 10231
Concentration of bacteria (cells/mL)	6.2x10^5	1.4x10^6
Volume of test inoculum (mL)	0.2	0.2
U_0	4.00	4.28
Ut	5.53	4.52
At	3.32	2.49
B (cells/cm²)	3.4x10^5	3.3x10^4
C (cells/cm²)	2.1x10^3	3.1x10^2
R	2.2	2.0
*The antibacterial activity rate (%)	99.4	99.1

Notes :

1. The control sample is plastic film without antimicrobial activity, provided by SGS laboratory.
2. U_0: the average of the common logarithm of the number of viable bacteria(cells/cm²) recovered from the untreated test specimens immediately after inoculation.
3. Ut: the average of the common logarithm of the number of viable bacteria(cells/cm²) recovered from the untreated test specimens after 24 h.
4. At: the average of the common logarithm of the number of viable bacteria(cells/cm²) recovered from the treated test specimens after 24 h.
5. R: the value of antimicrobial activity,R=Ut-At.
6. * The calculation formula of the antibacterial activity rate is【(B-C)/B】*100%;
   B: arithmetic average of the numbers of bacteria obtained from control samples after 24 h incubation(cells/cm²);
   C: arithmetic average of the numbers of bacteria obtained from samples after 24 h incubation(cells/cm²).
7. Pre-treatment: The surface of test specimen was wiped with 70% ethanol, rinsed with sterile water and let it air-dry.

****Tested by SGS Lab (Ref: GZF20-027305-01)***

FAQ

Q : How long does it last?

A : It will last as long as the glaze of the tiles is not worn out.

Q : Will washing with detergent damage the glaze?

A : No, as long as you use those that are recommended for ceramic tile floorings.

Q : What Certification do you have?

A : The tiles are tested by the internationally renowned independent laboratory - SGS Group. In Singapore the local subsidiary is SGS Testing Control Services Singapore Pte. Ltd.

Q : Will it work only if there is light?

A : Unlike other antibacterial solutions that are photocatalytic, nano zinc oxide is different. It has strong chemical activity in the absence of light or natural light, and can react with most organic substances (including bacteria), thereby killing most bacteria and microbes.

Q : How affordable is it?

A : Compared to other antimicrobial solutions for tiles that use nano silver oxide and nano titanium oxide, tiles with GuardTec are much cheaper.

Available at:

GuardTec is a product of Heritage Ceramics (APAC) Pte Ltd

Scan Qrcode to view our website or click here:
www.heritageceramics.com

Scan Qrcode to view our video or click here:
https://youtu.be/aW78BxqNNbU

Available exclusively for SPACE, STUDIO and SHAPE tile collections.

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SHAPE™ CERAMICS