

HEXIS NEW ANTIMICROBIAL FILM


PURE ZONE

Performance and protection anywhere, anytime



PURE ZONE[®]
Antimicrobial protection

*Feline coronavirus, Strain Munich & HCoV-229E



www.hexishealth.com

ANTIMICROBIAL PROTECTION
AT YOUR PREMISES





**THE NEW ANTIMICROBIAL
FILM BY HEXIS PROTECTS
YOUR PREMISES 24/7**

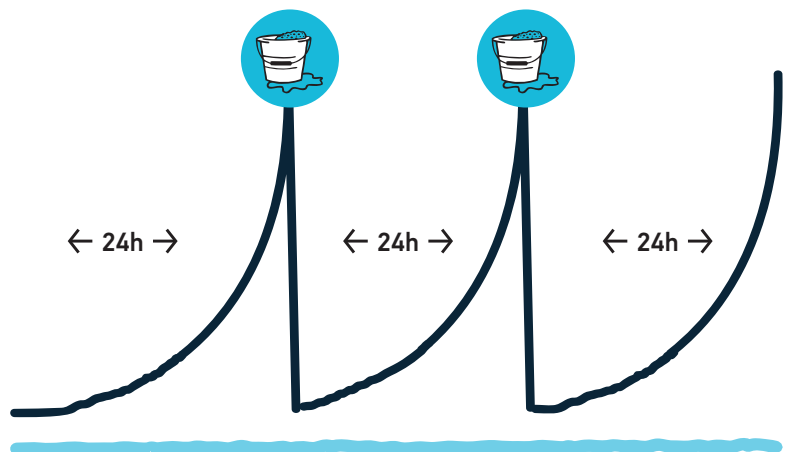
**→ YOU COMPLY WITH THE
GOOD HYGIENE PRACTICE
(GHP) AND YOU WISH YOUR
ENVIRONMENT TO BE :**

- 01.** Perfectly maintained
- 02.** Regularly cleaned
- 03.** Covered with waterproof, smooth and easy to wash materials



**→ HOWEVER, HAZARD
SHALL DEVELOP BETWEEN
2 CLEANING PHASES :**

- 01.** A biofilm may form
- 02.** Germs may spread



EVOLUTION OF BIOFILM

- without PURE ZONE
- with PURE ZONE

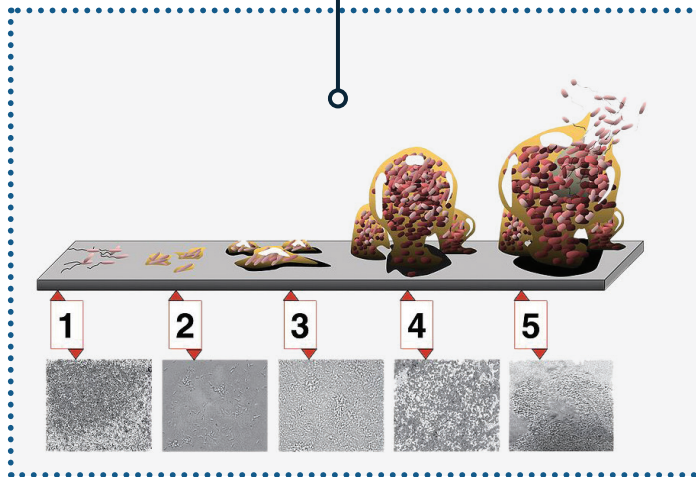
*See page 17 Regulation [EC] No 852/2004 of the European Parliament on the hygiene of foodstuffs

→ BIOFILM = DANGER

BIOFILM IS COMPOSED OF MICRO-ORGANISMS AND A MUCOUS LAYER THAT REQUIRES A MECHANICAL CLEANING ACTION.

THIS IS WHERE BACTERIA PROLIFERATE.

BIOFILMS FORM VERY QUICKLY



Studies suggest that silver ions are capable of destabilising the biofilm matrix (1), preventing the spread of germs within the matrix and enabling the cleaning products to be effective.

(1) Chaw KC, Manimaran M, tay FEH. Role of silver ions in destabilization of intermolecular adhesion forces measured by atomic force microscopy in *Staphylococcus epidermidis* biofilms. *Antimicrob Agent chemother* 2205;49(12):4853-59

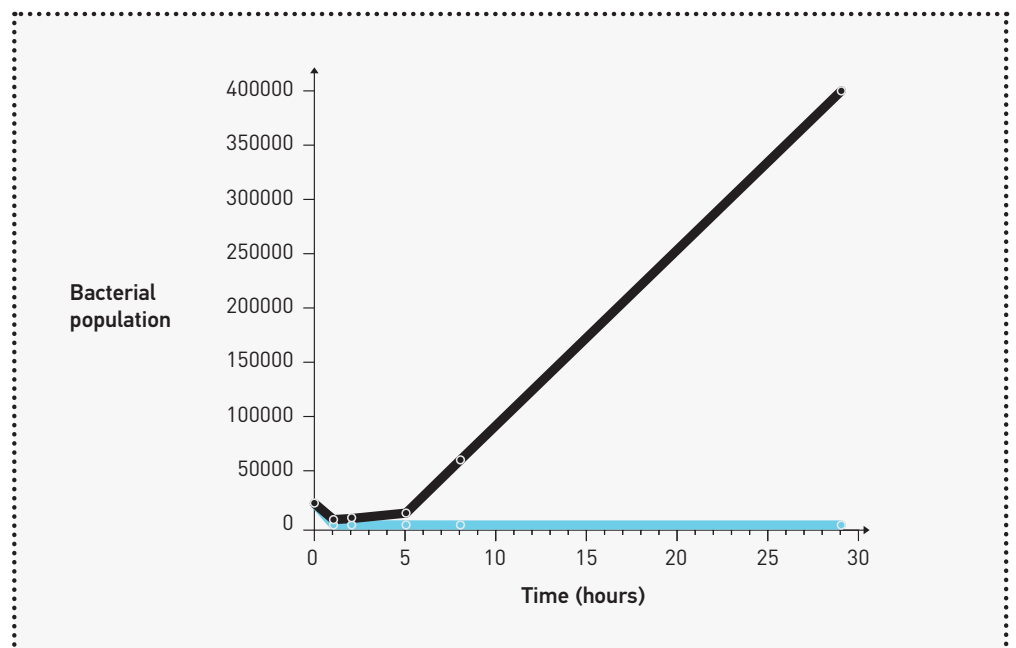
A biofilm is a complex microbial community, consisting of bacteria and, on occasion, fungal species embedded within a protective polysaccharide matrix.

Managing biofilm requires:

- Reducing the microbial load through intensive cleaning in order to eliminate dormant bacteria
- Preventing the biofilm from reforming (with silver ions that destroy the so-called solitary, free-floating planktonic bacteria, for instance)

HOW A BACTERIAL POPULATION GROWS

- without PURE ZONE
- with PURE ZONE



→ THE NEW HEXIS ANTI-MICROBIAL FILM

Germs need humidity to proliferate.
The HEXIS film is waterproof and
forms a barrier against humidity.

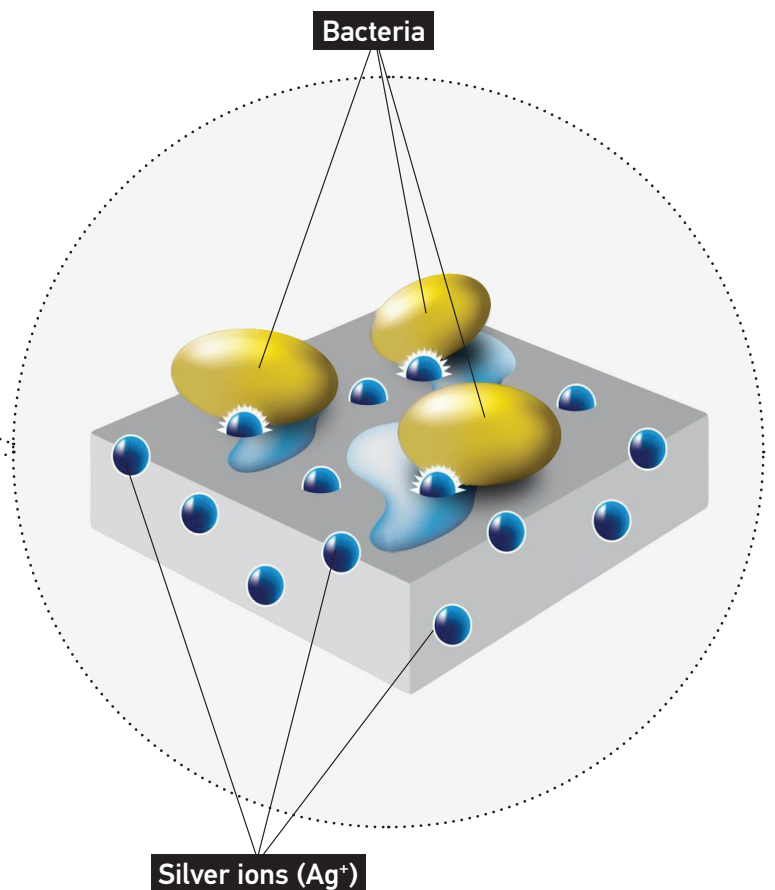


THIS IS A DECISIVE INNOVATION

During cleaning operations,
as well as in the presence of
humidity, silver ions are released
from the top layer of the film.

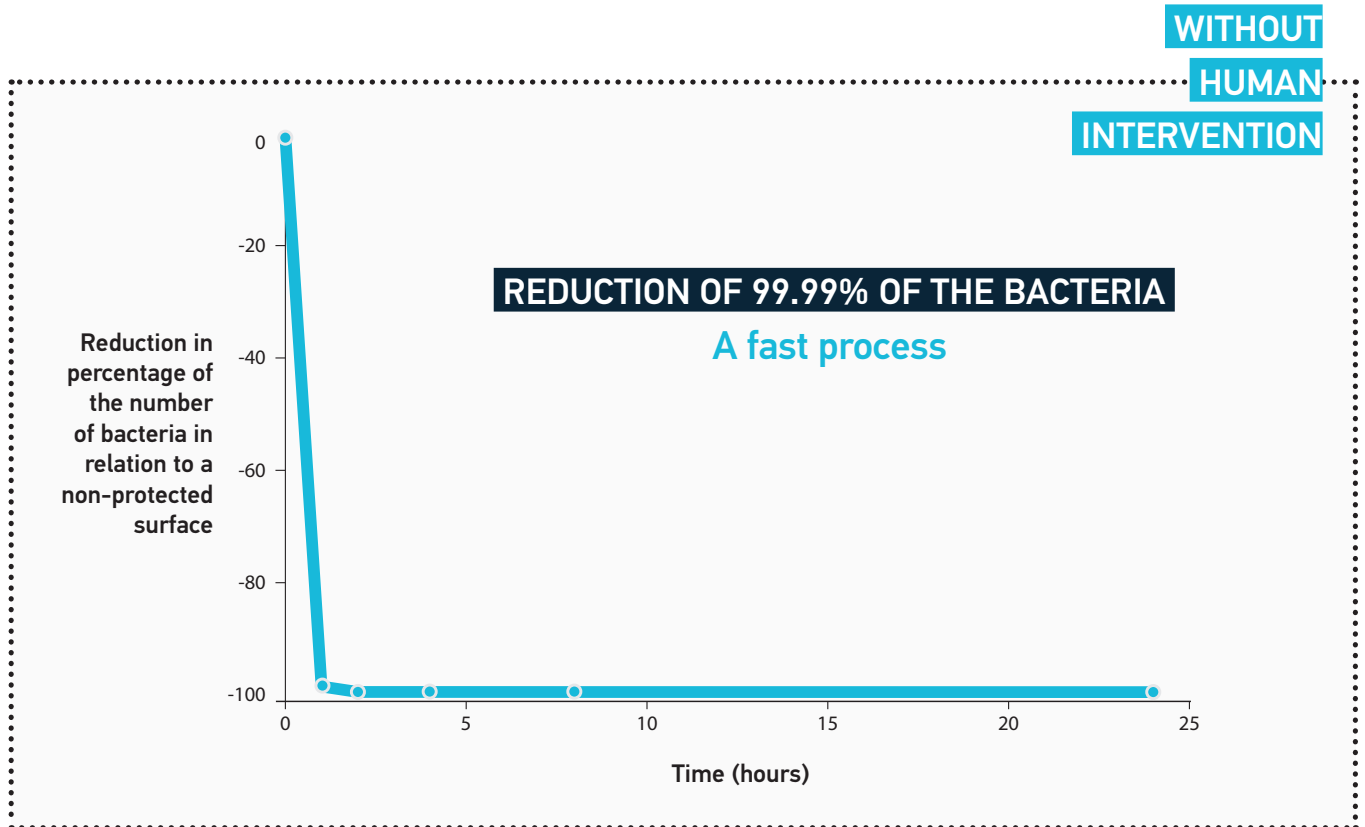
These ions come into contact
with the bacteria, blocking their
metabolism and/or interrupting
their proliferation mechanism,
leading to their destruction.

When the PVC film is manufactured
by HEXIS, silver ions encapsulated
in a glass matrix are distributed
over the film in a uniform manner.



→ THE ANTI-MICROBIAL EFFICIENCY OF SILVER IONS

- Protects 24h a day, 7 days a week, and thus between 2 cleaning phases
- Protects inaccessible areas
- Inhibits the development of 99.99% of the germs tested (tests in conformity with the ISO 22196 standard)
- Reduces a bacterial population by 4 logs
- Prevents the formation of biofilm
- Active for 5 years
- Perfectly ecological
- No nanoparticles



→ THE ANTI-MICROBIAL ACTION OF SILVER IONS

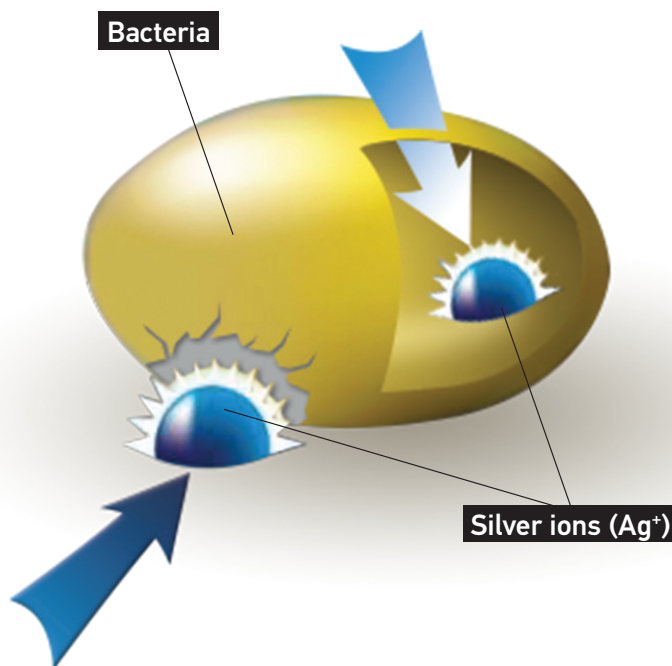
In its (elemental) metallic form, silver is inert and does not kill bacteria. Silver atoms (written as Ag or Ag₀) must lose an electron and become positively charged silver ions, Ag⁺. Silver is ionised in air, but above all in a humid environment.

Silver ions are highly reactive and affect multiple sites in bacterial cells, guaranteeing their destruction.



SILVER IONS :

- Produce alterations to the cell wall
- When transported into the cell, bind with proteins and interfere with the production of energy, enzyme function and cell replication
- Silver ions are active on a broad spectrum of bacteria

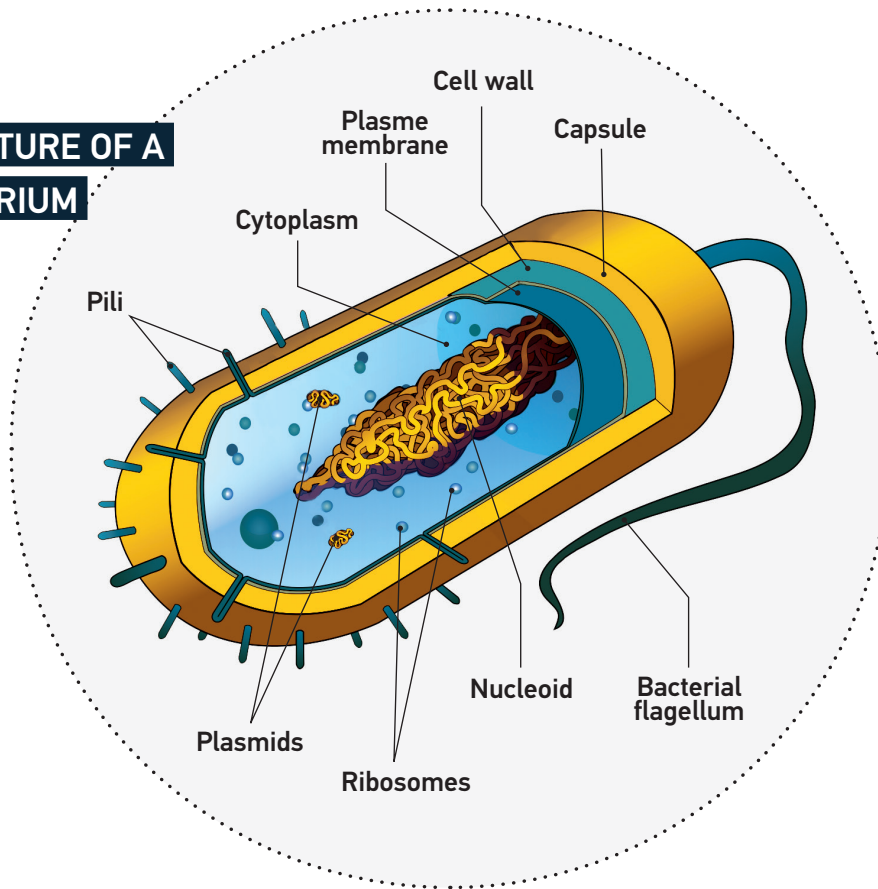


→ UNCONTROLLED MICROBIAL GROWTH IS THE MAJOR RISK

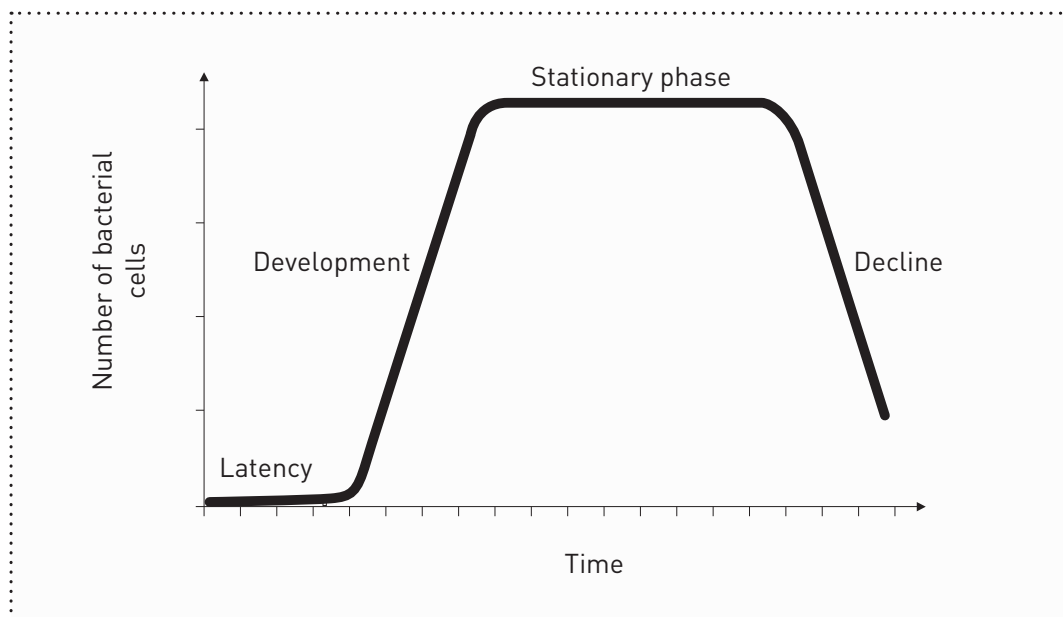
SUCH AS SALMONELLA, LISTERIA, ETC.

PROOF OF THE EFFICIENCY OF SILVER IONS ON LISTERIA

STRUCTURE OF A BACTERIUM



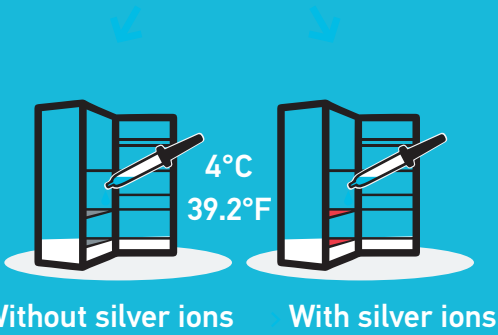
AFTER A LATENT PHASE, DEVELOPMENT BECOMES EXPONENTIAL



→ PROOF OF THE EFFICIENCY OF SILVER IONS ON LISTERIA

OPERATIVE PROCEDURE:

Seed the inside wall of a fridge with a Listeria colony



Sampling
Dilution
Counting (D 0, D 7, D 28)

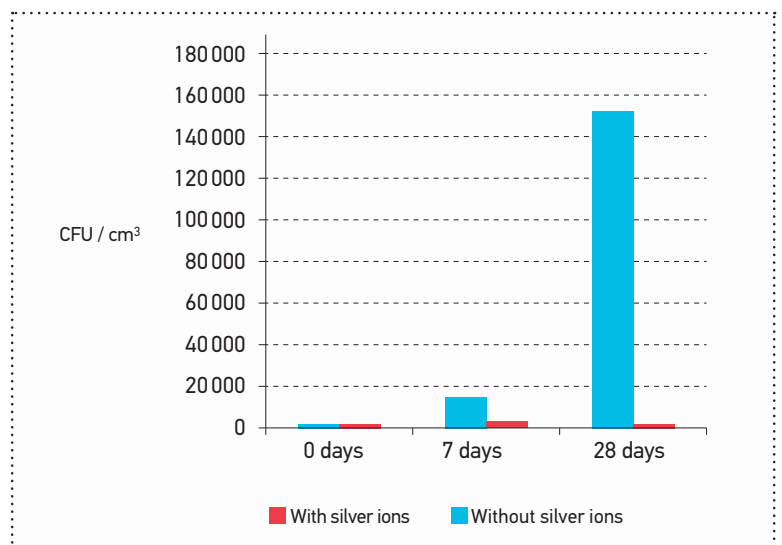


Counting the colonies of bacteria in terms of CFU/cm³ (Colony-Forming Units)



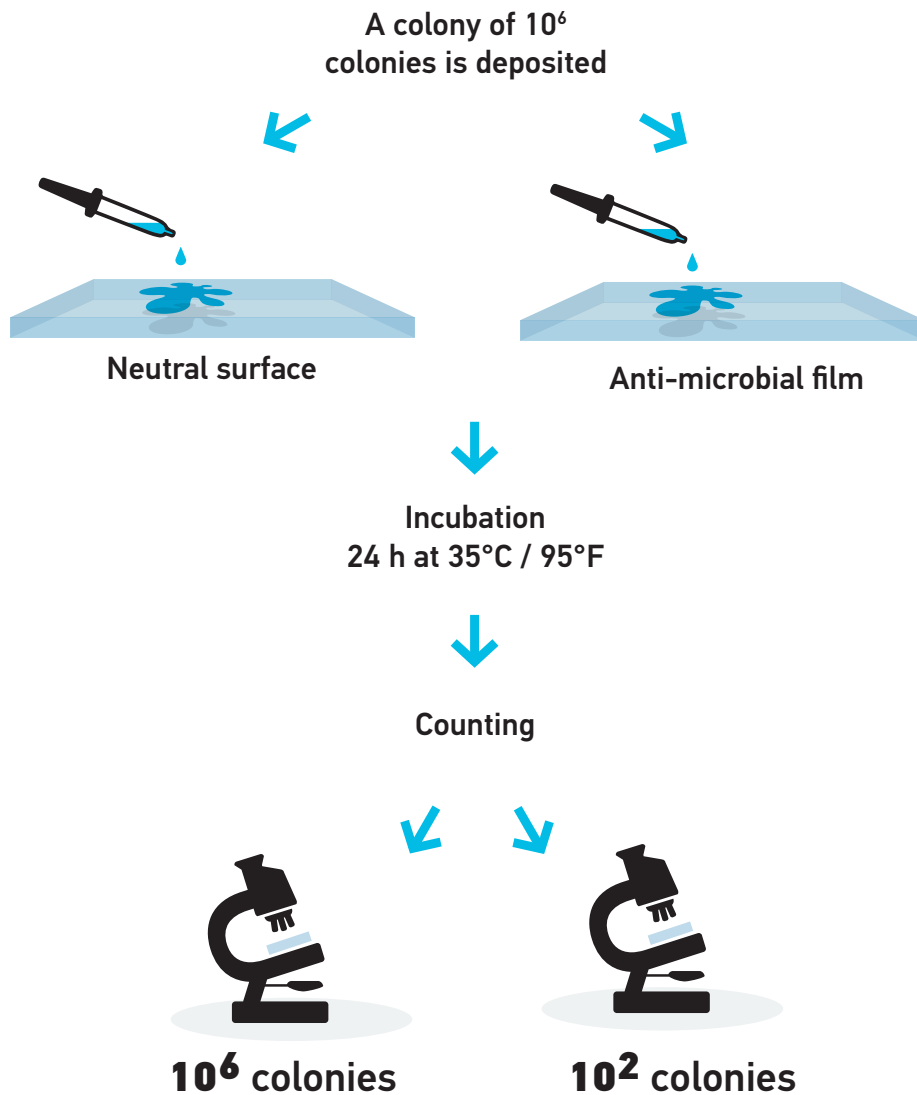
IF UNPROTECTED:

PROLIFERATION OF THE GERMS



→ HOW TO MEASURE THE ACTIVITY OF ANTI-MICROBIAL FILMS

CONTACT TEST (ISO 22196)



RESULTS:

Decrease of 4 log, or 99.99%, in the number of bacteria

There is a correlation between the logarithmic reduction and the percentage of reduction in the bacteria.

- Decrease of 1 Log: → Reduction of 90% in the number of bacteria
- Decrease of 2 Logs: → Reduction of 99% in the number of bacteria
- Decrease of 3 Logs: → Reduction of 99,9% in the number of bacteria
- Decrease of 4 Logs: → Reduction of 99,99% in the number of bacteria

→ PROOF FROM TESTS

ANTI-BACTERIAL ACTION

01. Fast

Rapid penetration into the bacterial cell.

02. Powerfull

Active even at very low concentrations.

03. Prolonged

24h a day, 7 days a week for several years.



THE ACTIVITY OF THE HEXIS ANTI-MICROBIAL FILM

Strain	Reduction in bacteria as a %	Logarithmic decrease
<i>Salmonella enterica subsp enterica</i>	99,99	> 4,6
<i>Listeria monocytogenes</i>	99,99	> 4,2
<i>Staphylococcus aureus</i>	99,99	> 4,1
<i>Escherichia coli</i>	99,99	> 4,5
MRSA	99,99	> 3,5
<i>P.aeruginosa</i>	99,99	> 5,7

N.B. The logarithmic reductions obtained with silver ions may differ depending on the techniques used and in relation to the incubation periods and milieus used.



Total Quality. Assured.

Intertek France - Etablissement de Chalon/Saône
[12 rue Alfred Kastler – Boite N° 7](#)
[71530 FRAGNES](#)
www.intertek-france.com

Reference : **CHL-R14-0815**
CHL-R16-1301

Certificate of analysis

Society : HEXIS
Address : ZI Horizons sud
34110 FRONTIGNAN

To the attention of: Nathalie SIBOLD

Customer Reference:	Film Antimicrobien Pure Zone
Intertek Sample Reference:	14-CHL-0815-02 / 16-CHL-1301-01
Date of Sample Receipt:	September 1 st , 2014 / November 28 th , 2016
Date of Sample Analysis:	September 10 th , 2014 / December 6 th , 2016
Date of the Certificate of Analysis:	July 21 st , 2017

Test:
Evaluation of antimicrobial efficiency based on ISO 22196

Results: The results are given as log reduction R, corresponding to the value of antimicrobial activity.

<i>Salmonella enterica subsp enterica</i>	R > 4.56 (for sample 14-CHL-0815-02)
<i>Listeria monocytogenes</i>	R > 4.21 (for sample 14-CHL-0815-02)
<i>Staphylococcus aureus</i>	R > 4.12 (for sample 14-CHL-0815-02)
<i>Escherichia coli</i>	R = 4.54 (for sample 14-CHL-0815-02)
<i>MRSA</i>	R > 3.51 (for sample 14-CHL-0815-02)
<i>Pseudomonas aeruginosa</i>	R > 5.37 (for sample 16-CHL-1301-01)

Certified by Sylvie LEBRAT
Laboratory Director

Intertek France – Etablissement de Chalon/Saône

This report only concerns samples submitted for testing. This report must not be reproduced, if not in entirety, without the written authorization of the laboratory
General Conditions of Services information available upon request. You can send your comments on this report in two months by email
serviceclientschalon@intertek.com



→ PROOF FROM TESTS

AN ANTIVIRAL ACTIVITY, EFFECTIVE ON EVERYDAY CONTACT SURFACES

01. Proven and tested efficacy on coronavirus (HCoV-229E) type viruses.*
02. Powerful: reduction of the viral load by 99.87%.
03. Quick: in just one hour!
04. Permanent: 24/7

*According to the standard ISO 21702 (2019).



*Feline coronavirus, Strain Munich & HCoV-229E

TESTS VIRHEALTH CONCLUSION ON HCOV-229E STRAIN

PRODUCT	contact duration (min)	Logarithmic reduction (log 10)	Antiviral efficiency (%)
PUREZON060 PRZ150	15	1.3	94,99%
PURECOVER	60	2.9	99,87%



I. CONCLUSION

Antiviral activity of the PUREZONE060/PRZ150/PURECOVER surface and non-active surface have been tested under conditions defined by the ISO 21702 (2019) adapted protocol for contact times of 15 and 60 minutes on the human coronavirus HCoV-229E

Stainless steel surface is the control for this test.

- PUREZONE060/PRZ150/PURECOVER surface, 15 minutes of contact time

Under experimental conditions, (20°C*, 15 minutes), the PUREZONE060/PRZ150/PURECOVER surface shows an antiviral activity associated with a logarithmic reduction of 1.30 log₁₀ which is equivalent to a 94.99% efficiency under the ISO 21702 adapted protocol.

- PUREZONE060/PRZ150/PURECOVER surface, 60 minutes of contact time

Under experimental conditions, (20°C*, 15 minutes), the PUREZONE060/PRZ150/PURECOVER surface shows an antiviral activity associated with a logarithmic reduction of 2.90 log₁₀ which is equivalent to a 99.87% efficiency under the ISO 21702 adapted protocol.

PRODUCT	Contact time (min)	Logarithmic reduction (log ₁₀)	Antiviral efficiency (%)
PUREZONE060/PRZ150/PURECOVER	15	1.3	94,99%
	60	2.9	99.87%

REPRODUCTION ET DIFFUSION INTERDITE SANS AUTORISATION

*68°F

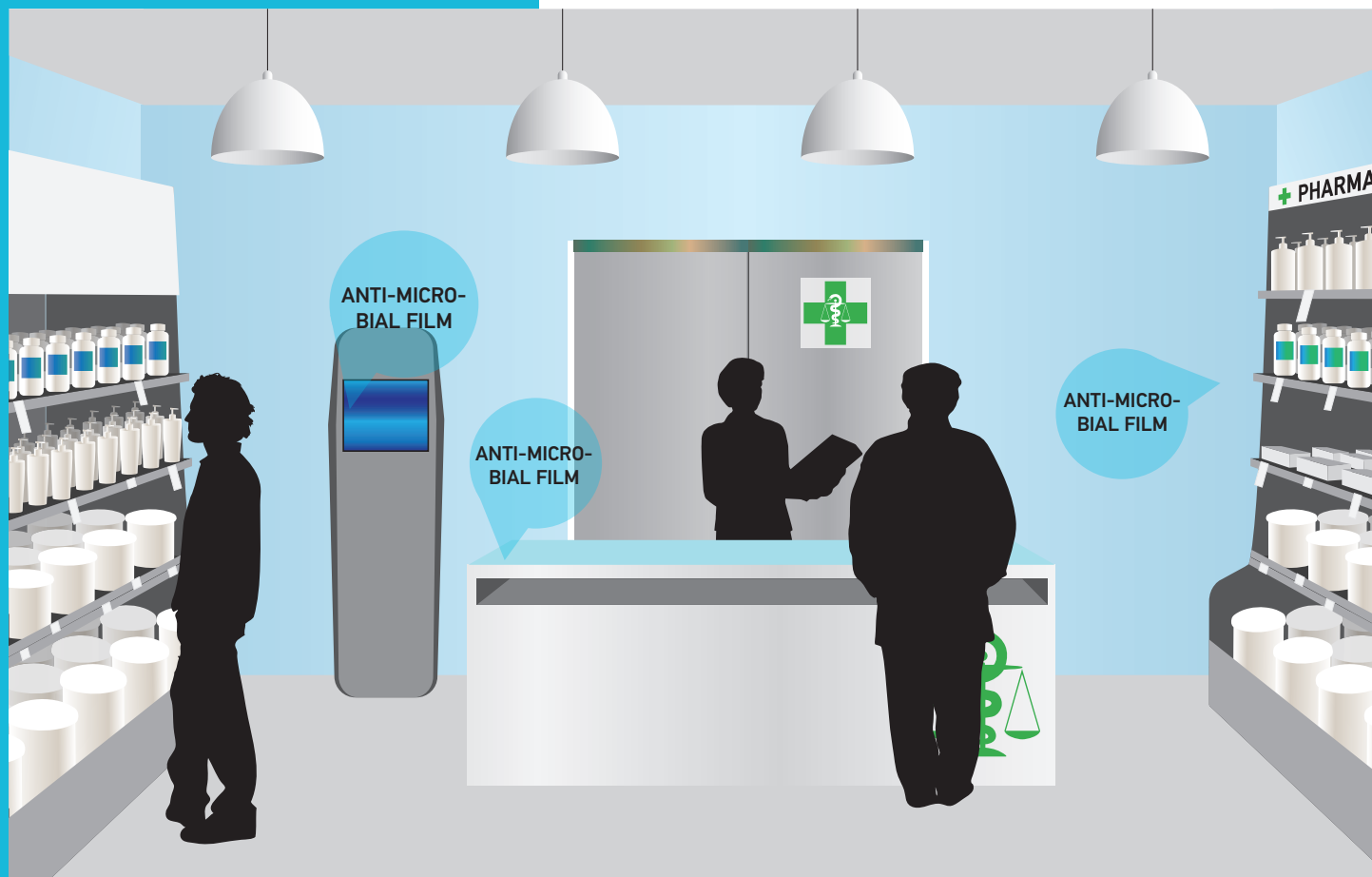
→ PROOF FROM TESTS

THE HEXIS FILM CAN BE APPLIED EVERYWHERE

The tested product is "NON-IRRITANT"

Safe for use on human skin.

Assessment and analysis of the irritant effect do not reveal any irritant effect, which demonstrates good skin compatibility of the product, PURE ZONE ANTIMICROBIAL FILM.



RAPPORT ETUDE
Réf : 832/0914-2302

Promoteur de l'étude
HEXIS
Z.I. Horizons Sud
34110 FRONTIGNAN
France

Investigateur responsable
BIOPHYDERM S.A.S.
PARC 2000
244, rue Claude François
34080 – MONTPELLIER

But de l'étude

Sous strict contrôle dermatologique, vérifier la compatibilité cutanée d'un produit destiné à être mis en contact avec la peau par tests épicutanés semi-occlusifs

Produit

FILM ANTI-MICROBIEN PURE ZONE
Lot B416324CE produit testé pur
HEXIS N° de test 2302

Méthodologie

Volontaires : 15 sujets sains, âgés de 18 à 65 ans

Inclusion : peau à tendance réactive sans origine pathologique

Exclusion : terrain allergique médicalement validé évolutif

Méthode : application directe semi-occlusive
temps d'application : 6 heures
lecture immédiatement après le retrait, puis à 30 minutes et à 24 heures

Résultats

L'indice d'irritation cutanée pour le produit **FILM ANTI-MICROBIEN PURE ZONE – Lot B416324CE – HEXIS - N° de test 2302, avec un temps d'application de 6 heures** est de : **0,27**.

Conclusions

Le produit testé est "**NON IRRITANT**"
Sans danger pour l'emploi sur peau humaine.
L'évaluation et l'analyse de l'effet irritant n'ont pas mis en évidence d'effet irritant, indiquant une compatibilité cutanée **satisfaisante** pour le produit **FILM ANTI-MICROBIEN PURE ZONE**.

Etude 832/0914 - Produit n°2302

Biophyderm S.A.S.
PARC 2000 - 244, rue Claude François - 34080 MONTPELLIER
Téléphone 33 (0)4 67 16 47 63 - Site www.biophyderm.net

STUDY REPORT
Ref: 832/0914-2302

Study Sponsor
HEXIS
Z.I. Horizons Sud
34110 FRONTIGNAN
France

Investigator in charge
BIOPHYDERM S.A.S.
PARC 2000
244, rue Claude François
34080 – MONTPELLIER

Aim of the study

To assess the cutaneous compatibility by means of semi-occlusive cutaneous tests under strict dermatological control of a product intended to be in contact with the skin

Product

FILM ANTI-MICROBIEN PURE ZONE
Batch B416324CE product tested pure
HEXIS Tested under No 2302

Methodology

Volunteers: 15 healthy subjects, aged between 18 and 65

Inclusion criteria: reactive tendency non pathological skin

Exclusion criteria: confirmed evolutive allergic background

Method: semi-occlusive direct application
application time: 6 hours
reading immediately after removal, then 30 minutes and 24 hours after

Results

The **cutaneous irritation index** for the product **FILM ANTI-MICROBIEN PURE ZONE – Batch B416324CE – HEXIS - test No 2302, with an application time of 6 hours** is: **0.27**.

Conclusions

The tested product is "**NON IRRITANT**"
Safe for use on human skin.
The assessment and the analysis of the irritant effect don't reveal any irritant effect, which demonstrates a **good cutaneous compatibility** of the product **FILM ANTI-MICROBIEN PURE ZONE**.

Study 832/0914 - Product n°2302

**IN YOUR PREMISES,
THE SAME TECHNIQUE,
THE SAME ADVANTAGES**

**→ HEXIS ADHESIVE FILMS
ARE USED ON TRAINS,
UNDERGROUNDS,
PLANES, AND ARE THUS
EXPOSED TO SIGNIFICANT
CONSTRAINTS**

- 01.** Strong adhesion
- 02.** Easy to clean
- 03.** Waterproof
- 03.** Conformable



→ HEXIS PVC ADHESIVE FILMS

YOUR CLEANING PROTOCOL IS RESPECTED

- Smooth and sleek, so easy to clean
- Perfectly waterproof
- Easy to apply, without disrupting your organisation, all substrates, constructions, insulated panels, sandwich panels, etc.
- In all areas subject to health constraints: clean rooms, white rooms, cold stores
- Compatible with your cleaning protocols. Resistant to most chemical agents, alcohol, diluted acids, oils
- The films have an acrylic adhesive which is pressuresensitive. Adhesion is immediate, and permanent after 24h of contact
- Manufactured in France at the Hexis factory
- Hexis international patent



→ THE PURE ZONE LABEL

PURE ZONE®

Antimicrobial
protection



*Feline coronavirus, Strain Munich & HCoV-229E

www.hexishealth.com

To allow your clients, staff and partners to identify the areas protected with the anti-microbial film, Hexis have created the PURE ZONE label which can be applied to doors, counters, windows, tables, etc., thus indicating

**MANAGEMENT
OF ANTI-MICROBIAL
PROTECTION ON
YOUR PREMISES**



HEXIS Antimicrobial Film - **PURE ZONE®**

→ EUROPEAN REGULATIONS ON FOOD HYGIENE 852/2004

OBLIGATIONS IN TERMS OF REGISTRATION:

Establishments that produce foodstuffs of animal origin may be authorised under certain conditions (see regulation 853/2004).

The concept of cooperation with the control administrations is clearly defined in the regulations.

→ REQUIREMENTS APPLICABLE IN TERMS OF HYGIENE AS OF 01 JANUARY 2006

1. Equipment and materials:

In general terms, these requirements come from the principle of an **obligation for results** rather than of means (with the exception of toilets, hand-washing stations and changing rooms). The principle of **making progress in time and space has been retained**.

A few key points:

- Clean premises in a good state of upkeep
- Sufficient, ventilated work areas to prevent any condensation phenomena
- Avoid all risk of contamination and cross-contamination
- Control the cold chain
- Have surfaces (floor, wall, ceiling, doors, windows) and equipment surfaces that are smooth and easy to maintain
- Have waterproof, non-corrosive materials and equipment
- Have adequate systems for cleaning and disinfecting tools, materials, etc.
- Fight against pests
- Good lighting, cleanliness and a good state of upkeep of the premises: cleaned and disinfected
- Specific provisions for cars, shops and transport are also set out in the regulation



ANTIMICROBIAL SOLUTIONS FOR DECORATION

→ PURE ZONE® FILM 4 FINISHES

01. PURZONE060B

Gloss finish

02. PURZONE060M

Matt finish

03. PCAPMGB

Leather grain

04. PCWOOD

Wood grain



→ PURE ZONE® FILM CAN BE USED :

01. to protect a simple surface
02. to protect a printed graphic design



→ PURE ZONE® FILMS CAN BE APPLIED ON MANY SUBSTRATES



01.
Smooth
Metal Sheet



02.
Wood



03.
MDF



04.
Glass



05.
Marble

→ YOU ONLY HAVE TO CHOOSE

01. your printable film

2D, 3D
Short to long term
Type of adhesive depending
on substrate

02. The PURE ZONE® finish and your design

HEXIS offer lots of texture on:
hexperience.hexis-graphics.com

03. Your laminate

Leather grain, wood grain,
gloss or matt



→ GLOSSARY

MICROBE

It is a living organism that is not visible to the naked eye. In this family there are bacteria, fungi, yeasts, molds but also viruses.

BACTERIA

Micro-organisms characterized by the absence of a cell nucleus. They spread by cell division, at a speed that may vary depending on the environment. They are characterized by their cellular membrane (Gram-positive or Gram-negative) as well as their shape (coccus or bacillus).

FUNGI/YEASTS/MOLDS

Still single- or multiple-cell living organisms that absorb organic molecules directly into the environment they are.

VIRUS

Microorganism that requires the presence of a host cell to reproduce. Smaller in size than other microbes.

BACTERICID

Molecule or substance is called bactericide when it has the ability to kill bacteria. This is characterized by a 99.999% reduction (or log 5) of bacterial load according to ISO 22196.

BACTERIOSTATIC

Molecule or substance is called bactericidal when it has the ability to kill bacteria. This is characterized by a reduction of 99% (or log 2) to 99.999 % (log5) of bacterial load according to ISO 22196.

BIOCIDE

Any substance or mixture, in the form in which it is delivered to the user, consisting of one or more active substances, containing or producing, which is intended to destroy, repel or turn harmful organisms to be harmless, to prevent their action or to fight them in any other way than a simple physical or mechanical action. These products are managed by EU Directive 98/8/EC of 16 February 1998 replaced in 2012 by a regulation.

PATHOGEN

A pathogenic agent is a factor (chemical molecule or organism) than can lead to an injury or cause a disease.

NOSOCOMIAL

A nosocomial infection is an infection contracted in a health facility. It is defined as any infection that occurs during or following patient care process (diagnostic, therapeutic or preventive act) provided that the infection is neither present nor incubating at the time of patient care process (a 48-hours delay after hospitalization is usually admitted).

SILVER SALT

Neutral chemical molecule consisting of a positive silver ion and a negative counter-ion (eg silver nitrate $Ag^+ NO_3^-$).

SILVER ION

Oxidized form of metallic silver (always associated with a counter-ion) and which under this state has biocide properties on microbes.

HOW THE BIOCIDES ARE ACTING IN THE FILM

Active agent disrupts the wall of the bacteria. It then penetrates the cell, binds to a protein and disrupts energy production, enzyme functions and cell duplication phenomena. This is acting by contact. The bacterium does not die, but its spread is greatly reduced. There is no biocide emission in the surrounding atmosphere.

SURFACE EFFICIENCY KINETICS

After one hour of contact (following Iso 22196), 99% of Salmonella bacteria were destroyed.

FILM CLEANING

No decrease of the activity after 365 cleaning operations with water, ethanol, bleach or «ANIOSURF»

ESCHERICHIA COLI

Gram- bacteria, found in mammals. They represent 80 % of human's intestinal flora. It can cause diarrhea, urinary and gastric infections, meningitis, septicaemia.

STAPHYLOCOCCUS AUREUS

Gram+ bacteria, found in humans, in the nasal cavity or throat. It can cause food poisoning, skin infections (pus production). An untreated infection, or if on an immunosuppressed patient, can lead to septicaemia, that might be fatal.

METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA)

Gram- bacteria; it is a specific strain of S. Aureus that has developed resistance to an antibiotic (methicillin), and is therefore more difficult to control.

It is part of the multi-resistant bacteria (MRB). It can cause infections and septicaemia, which are more serious and therefore there is a higher mortality than with ordinary staphylococcus aureus.

LISTERIA

Gram+. The human contamination comes mainly from food (poorly washed fruits, undercooked meats...). It can cause listeriosis (more or less severe symptoms: fevers, headaches, meningitis, septicaemia...), especially among fragile people (eg pregnant women)

SALMONELLA

Gram+. This bacterium is able to colonize food manufacturing premises and its vector is therefore food. It can cause gastroenteritis, food infections, septicaemia, meningitis (infants) and typhoid fevers.

PSEUDOMONAS AERUGINOSA

Gram- . They are one of the most resistant and difficult bacteria to handle. They have a strong ability to form biofilms. They can cause eye infections, sores, urinary, intestinal and lung infections; septicaemia for immunosuppressed patients, as well.

BIOFILM

(multi)-bacterial layer organized and aggregated on a surface, resistant to certain cleaning and disinfection protocols. This is the next step after bacterial colonization.

METHICILLIN

Discovered in 1959, it is a β -lactamine type antibiotic, belonging to penicillase-resistant penicillins' group.

ANTIBIOTIC

An antibiotic (from ancient Greek anti: «against,» and bios: «life») is a natural or synthetic substance that destroys or blocks the growth of bacteria. In the first case, it is called a bactericidal antibiotic and in the second case a bacteriostatic antibiotic.

GRAM+AND GRAM-

GRAM test consists of coloring the membrane. If the bacterium has a thick membrane, a coloration appears and the bacteria is called gram+. If no coloration is visible on the bacterium, it is called Gram -.

COCCUS BACTERIA

The bacterium is in a spherical form, it is called coccus

BACILLUS BACTERIA

The bacterium is in a more or less elongated stick form; it is called bacillus.

ISO 22196

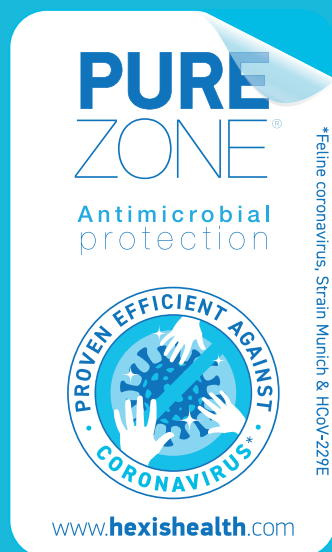
International standard that measures the decline of bacteria in contact with a substance: 10⁶ colonies of bacteria are put in a box (or in a liquid) and after a certain period (24 hours to 35 °C in general) remaining colonies are counted.

ANIOSURF

disinfection liquid from the company Anios, widely used in the medical community.

VIRUCIDE, FUNGICIDE, YEASTICIDE

a product or process that has the ability to inactivate viruses, fungi or yeasts under defined conditions.



HEXIS - HEADQUARTERS

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