





THE ESSENTIAL

ANTI-VIRUS & MICROBIAL COPPER FILM





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WHAT DO YOU COME IN CONTACT WITH, IN YOUR EVERYDAY WORLD?

White Square Inc.





What is a VIRUS?







Like SARS (Severe ere

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Acute Respiratory Syndrome) and MERS (Middle East Respiratory Syndrome), are pathogenic organisms that are known to be more influential to animals than humans. Though occasionally, they can mutate over time and through many species, to become a threat to humans.

However, since the development of a vaccine or cure, require great dedication and participation from the government, as well as time and funds to get through all clinical tests and approvals, <u>the only option for</u> <u>preventing the spread of the virus is by</u> <u>decomposing it before contact on humans.</u>

Human Infection and Mechanism of the Virus



The "Glycoprotein Spike", plays a key role in penetrating and invading the human cell.

RNA is the carrier of genetic information in the virus.

The Principle in Antiviral effect of Copper



White Square Inc.

Transcription: Role of the RNA Polymerase



RNA polymerase is the main enzyme involved in transcription. It reads one of the DNA strands and adds complementary nucleotide bases to make an mRNA transcript. The mRNA will later be translated into protein.

Bacteria infected hands create a great environment for virus replication.

Antimicrobial copper acts as an inhibitor of virus RNA replication and prevents the viruses of self-

replication.

Antimicrobial Activity of Copper

Human coronavirus proliferates at least for 5 days on the materials such as plastic, ceramic tile, glass, and stainless steel.



Antimicrobial Activity of Copper However, it is deactivated on a Copper surface within 30 minutes. Copper completely destructs the body structure and genome of the virus!! В A Log 10 pfu per coupon 10 10 10 11 C21000 (95% Cu) C21000 (95% Cu) C22000 (90% Cu) C22000 (90% Cu) C23000 (85% Cu) C23000 (85% Cu) C26000 (70% Cu) C26000 (70% Cu) C28000 (60% Cu) C28000 (60% Cu) Z13000 zinc Z13000 zinc C11000 (100% Cu) C11000 (100% Cu) S30400 stainless steel S30400 stainless steel

▲ Human Coronavirus 229E Remains Infectious on Common Touch Surface Materials (Sarah L. Warnes, Zoë R. Little, C. William Keevil)

100

Contact time (minutes)

150

50

0

0

10

20

Contact time (minutes)

30





After 10 minutes of exposition to Stainless Steel, the virus is still visibly generated.

Research showed 'anti-microbial copper' rapidly deactivated the



After 10 minutes of exposition to copper, numerous particles of the virus have rapidly decomposed.



After 30 minutes of exposition to copper, additional damage to the virus leading to damage on the surface of the spike.



Structure of Antimicrobial Film

Providing an optimal antibacterial solution by applying a special process according to the customer's required characteristics.

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White Square In

Copper film + PE + Adhesive



APPLICATIONS AIRPORTS



RESTROOMS

ELEVATOR BUTTONS

ESCALATOR HANDRAILS

KIOSK MACHINES



APPLICATIONS HOTELS



CARTS

HANDRAILS



DOORS

COUNTERS

APPLICATIONS

AUTOMOTIVES



TRAILERS

TRUCKS



CARS

TRAINS/BUSES

ANTIMICROBIAL FILM CERTIFICATION IN KOREA



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TEST REPORT

APPLICANT: R&F Chemical

REPORT NO.	: M287-20-01023
SAMPLE RECEIVED DATE	: 2020-03-18
REPORT ISSUED DATE	: 2020-03-24
PAGE	: 1 OF 4

DESCRIPTION : ONE(1) PIECE OF SUBMITTED SAMPLE SAID TO BE FILM.

ITEM RNF Anti-microbial Film(Brown)

TEST CONDUCTED : AS REQUESTED BY THE APPLICANT, FOR DETAILS PLEASE SEE ATTACHED PAGES. _____

01. ANTIMICROBIAL ACTIVITY AND EFFICACY (JIS Z 2801 : 2010, FILM-CONTACT METHOD) : CFU/m', VALUE OF ANTIMICROBIAL ACTIVITY : log

		BLANK	#1
BACTERIA-1	AT BEGINNING	1.7 x 10 ⁴	1.7 x 10 ⁴
	AFTER 24 h	2.6 x 10 ⁴	< 0.63
	VALUE OF ANTI-MICROBIAL ACTIVITY		4.5
BACTERIA-2	AT BEGINNING	1.4 x 10 ⁴	1.4×10^4
	AFTER 24 h	1.1 x 10 ⁶	< 0.63
	VALUE OF ANTI-MICROBIAL ACTIVITY	-	6.2

NOTE) STANDARD FILM : STOMACHER® 400 POLY-BAG TEST CONDITION : THE SOLUTION ARE FIXED AT (35 ± 1) °C, 90 % R.H. FOR 24 h, AND DETERMINE BACTERIA CELL GROWTH INHIBITION RATE BY POUR AGAR PLATE METHOD. ANTIMICROBIAL EFFICACY : THE VALUE OF ANTIMICROBIAL ACTIVITY SHALL NOT BE LESS THAN 2.0 log TEST BACTERIA : BACTERIA-1 - Staphylococcus aureus ATCC 6538P BACTERIA-2 - Escherichia coli ATCC 8739 SEE ATTACHED PHOTOS.

** End of The Report **

** SAMPLE POTHO **



e-DOCUMENT SERVICE

The test results contained in this report are limited to results on the sample(s) that is provided by client and are not necessarily indicative or representative of the qualities of the lot from which the sample(s) was taken or of all products. Results contained in this report are not based on the quality certification of sample by the FITI quality certification program unless specifically requested by the client. Further use of the results of this report is prohibited unless allowed under a separate agreement set forth In an official document that is established between the client identified on this letter and the FITI. This test report is Irrelevant to KS Q ISO/IEC 17025 and KOLAS accreditation.

<u> * Explanation of Certification</u>

Antimicrobial effect standard value : 2.0

▶ Value 2.0 = 100 times of bacteria are inhibited compared to non-

antibacterial treated samples

4		
Weak effect	2.0 Fail ↔ Pass	Strong effec
▼ The medium is clear	n ▼ Pr	oliferation i

because the growth of bacteria is suppressed.

Treated culture medium

fiei

No. M287-20-01023

: Escherichia coli ATCC 8739

FiliTI시험연구원

Sample

Test Strain

▼ Proliferation is not inhibited and growth is free.

Non-treated culture medium



<test condition=""></test>
35°C / RH 90% / 24hr culture
Strain 1 : Staphylococcus aureus
Strain 2 : Escherichia coli



