



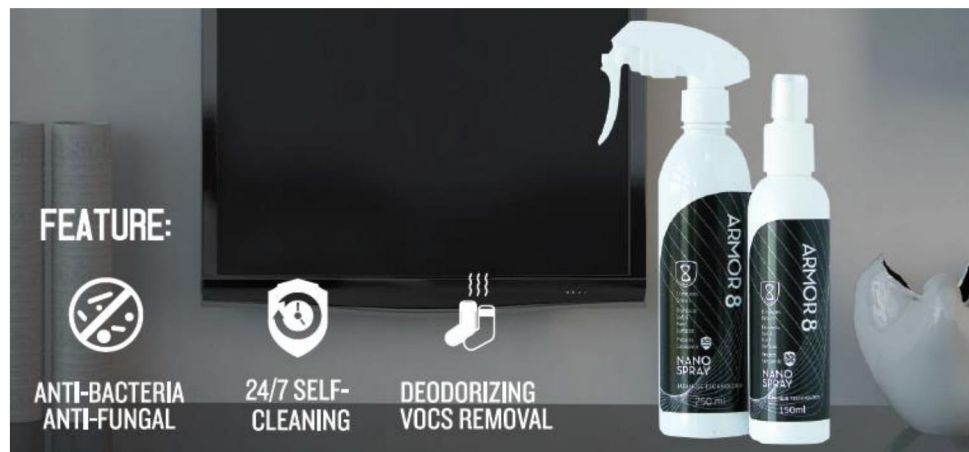
MS ISO/IEC 17025
TESTING
SAMM NO. 823



SUMMARY

Test Report No.: VX-TR-20-0260
Copy No.: 1

DETERMINATION OF THE VIRUCIDAL ACTIVITY – HUMAN CORONAVIRUS TEST (EN 14476) OF ARMOR 8

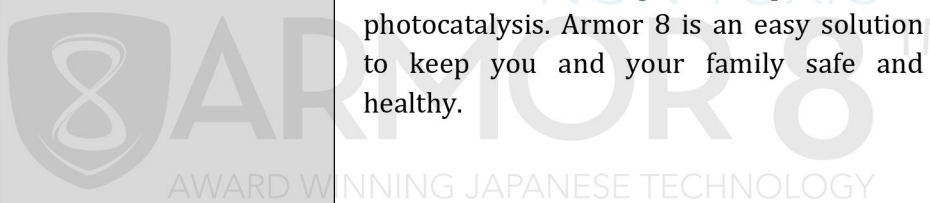


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Product and Test Information:

Sample Name:	ARMOR 8
Test Method:	EN 14476:2013+A1:2015 (E) Chemical disinfectants and antiseptics – Quantitative suspension test for the evaluation of virucidal activity in the medical area – Test method and requirements (phase 2, step 1)
Product appearance:	Clear solution
Product info:	ARMOR 8 is a unique self-applied nano-technology coating that deodorises, sanitises, and eliminates germs, bacteria, and viruses through the process of photocatalysis. Armor 8 is an easy solution to keep you and your family safe and healthy. 
Test organism(s):	Human coronavirus, strain 229E, ATCC VR-740
Concentration/contact time:	100.00 %* / 5 and 30 minutes
Loading:	0.30 g/L bovine albumin solution
Test temperature:	20 °C ± 1 °C
Incubation period:	5 days, 36 °C ± 1 °C
Testing method:	Quantal test
Inactivation method:	Immediate dilution Molecular sieving using MicroSpin™ S 400 HR

Test results:

Table A: Evaluation of the virucidal activity of ARMOR 8 on test strains according to EN 14476

Product: ARMOR 8
Loading: 0.30 g/L bovine albumin solution

Test strain: Human coronavirus ATCC VR-740

Virus control, V _c	Cytotoxicity effect, CE
V _{c1} : 6.38 ± 0.25 V _{c2} : 6.00 ± 0.38	CE ₁ : 1.50 ± 0.00 CE ₂ : 1.50 ± 0.00

Test concentration (%) / contact time (min)	First assay, N _{a1}	Second assay, N _{a2}	Average reduction
100.00* / 5	N _{a1} : ≤1.50 ± 0.00 lg R ₁ : ≥4.88 ± 0.25	N _{a2} : 1.63 ± 0.25 lg R ₂ : 4.38 ± 0.45	lg R: ≥4.63 ± 0.36
100.00* / 30	N _{a1} : ≤1.50 ± 0.00 lg R ₁ : ≥4.88 ± 0.25	N _{a1} : 1.63 ± 0.25 lg R ₁ : 4.38 ± 0.45	lg R: ≥4.63 ± 0.36

Table B: Control tests and method validation for Table A

Test strain	Cell susceptibility control	Suppression efficiency control	Reference test for virus inactivation
Human coronavirus ATCC VR-740	A: 6.25 ± 0.33 A _{PBS} : 6.50 ± 0.00	B: 5.38 ± 0.25 V _c : 5.88 ± 0.37	C ₃₀ : ≥4.00 ± 0.00 C ₆₀ : ≥4.00 ± 0.00

Note:

TCID₅₀:	The dilution of the virus suspension that induces a cytopathic effect (CPE) in 50 % of cell culture units.
CPE:	The morphological alteration of cells and/or their destruction caused by the cytopathic effect of virus multiplication.
V_c:	log ₁₀ TCID ₅₀ per ml in the viral test suspension at the beginning and at the maximum contact time.
N_a:	log ₁₀ TCID ₅₀ per ml in the test mixture at the end of the contact time.
CE:	The morphological alteration of cells caused by the cytotoxicity effect of the product test solution.
A:	log ₁₀ TCID ₅₀ per ml in the cell susceptibility control as compared to PBS
B:	log ₁₀ TCID ₅₀ per ml in the suppression efficiency control as compared to the virus control
C:	log ₁₀ TCID ₅₀ per ml in the reference test for virus inactivation after 30 and 60 minutes (5 and 15 minutes for vacciniavirus)

Table C: Summary of the log reductions of the quantitative suspension test according to EN 14476

Test strain	Test concentration (%) / contact time (min)	Log reduction (TCID ₅₀ /ml)	Associated risk†
Human coronavirus ATCC VR-740	100.00* / 5	≥4.63 ± 0.36	Minimal risk of false acceptance
	100.00* / 30	≥4.63 ± 0.36	Minimal risk of false acceptance

* The product can only be tested at 80.00 % concentration or less, as some dilution always occurs when test organisms and interfering substance are added.

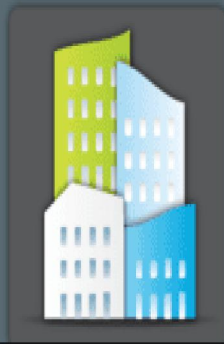
† The decision rule applied is simple acceptance rule with no guard band and up to 50 % risk of false acceptance or rejection. This rule has been determined by the laboratory and agreed with the client prior to testing.

Conclusion

ARMOR 8 showed the required virus reduction of ≥ 4.0 log₁₀ against test strain Human coronavirus ATCC VR-740 in accordance with EN 14476:2013+A1:2015 (E) at 100.00 %* concentration after 5 and 30 minutes under the stated condition. According to the simple acceptance decision rule†, there is a minimal risk of false acceptance. This result clearly to show that percent reduction of strain Human coronavirus ATCC is greatly reduce between 99.99% and 99.999% within 5 minutes of exposure time (please check Appendix A for better understanding).

References

1. Photocatalytic disinfection using titanium dioxide: spectrum and mechanism of antimicrobial activity, Applied Microbiology and Biotechnology 90(6):1847-68, (2011).
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5. Contaminant-activated visible light photocatalysis, Scientific Reports, volume 8: Article number: 1894 (2018).
6. Photocatalysis could be used to inactivate coronaviruses, Photonics Media, USA 2020, ([https://www.photonics.com/Articles/Photocatalysis Could Be Used to Inactivate/a65761](https://www.photonics.com/Articles/Photocatalysis%20Could%20Be%20Used%20to%20Inactivate/a65761)).



ARMOR 8

Log Reduction Fact Sheet

“Log” stands for logarithm, which is the exponent of 10. For example, Log-2 represents 10^2 or 10×10 or 100. Log Reduction stands for a 10-fold (one decimal) or 90% reduction in numbers of live bacteria.

Another way to look at it is: 1-Log Reduction would reduce the number of bacteria 90%. This means, for example, that 100 bacteria would be reduced to 10, or 10 reduced to 1.

of Microbes

1,000,000

800000

600000

400000

200000

100,000

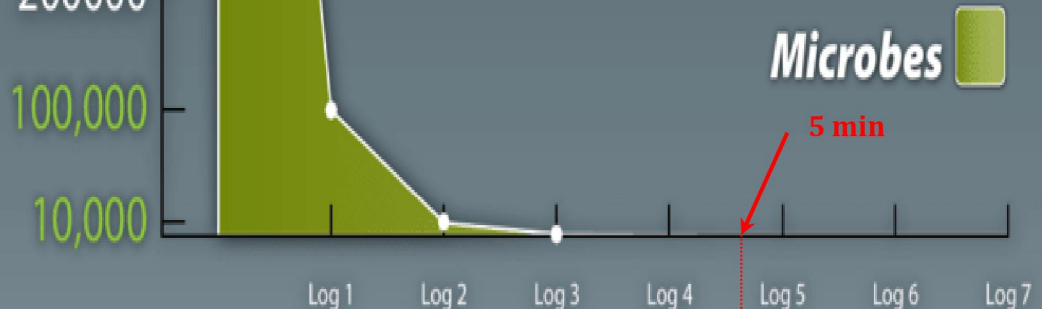
10,000



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This chart illustrates the impact log reductions have on a surface harboring 1,000,000 microbes.

A 3-Log Reduction on a surface with 1,000,000 microbes would leave 1,000 microbes, which equates to a 99.9% reduction in potentially harmful microorganisms.



1,000
99.9%

100
99.99%

10
99.999%