K.R.Biotech Global Disease Control Research Institute's test results _ results _ institutions specializing in animal-derived drug and medical device virus inactivation testing

## COVID-19 death test report (Virus death test by visible light irradiation)

**'COVID-19 Virus 99.99% Dead'**

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### 시험성적서

| | | | | |
|---|---|---|---|---|
| 의뢰인 | 담당자 | 선화주 | 전화 | 02-555-0500 |
| | 소속 | ㈜말타니 | 이메일 | shj26@maltani.co.kr |
| | 주소 | 서울특별시 강남구 역삼로 431 말타니빌딩 | | |
| 의뢰내용 | LED 조사에 의한 바이러스 사멸 실험 | | | |
| 제품 | 말타니 가시광 살균조명 크린시리즈 모듈 | | | |
| 제품사용용도 | 살균 | | | |
| 시험바이러스 | COVID-19 (SARS-CoV-2) | | 세포주 | Vero-E6 |
| 시험번호 | KR-2009-042-MTN01-C | | 시험기간 | 2020.09.04-09.11 |
| 처리시간 | 30분, 60분, 90분 | | 역가측정 | CPE |
| 시험온도 | 상온 (약 20℃) | | 시험자 | 조한샘 |

### 시험결과

| 제품명 | 바이러스 $TCID_{50}$ | 거리 | 처리시간 | 바이러스 감소율 (log) | 바이러스 감소율 (%) |
|---|---|---|---|---|---|
| 말타니 가시광 살균조명 크린시리즈 모듈 | $6.81X10^6$ | 20 cm | 30 분 | 2.42 | 99.62% |
| | | | 60 분 | ≥4.42 | ≥99.99% |
| | | | 90 분 | ≥4.00 | ≥99.99% |

**결과:** ㈜말타니의 가시광 살균조명 크린시리즈 모듈에서 발생되는 가시광선 (405nm)에 의한 COVID-19 (SARS-CoV-2)에 대한 살균력 시험 결과 20cm에서 60분 처리에 99.99% 이상의 바이러스 사멸 효능을 보였음.

2020 년 09 월 17 일

시험책임자: 김 영 봉 (인)

주식회사 케이알바이오텍

*이 성적서는 의뢰자가 제시한 시료 및 시료명에 한정된 결과로써 전체 제품에 대한 품질을 보증하지 않습니다.
* 이 성적서는 홍보, 광고 및 소송용으로 사용될 수 없으며, 용도 이외의 사용을 금합니다.

Kill more than 99% of COVID-19 viruses in 30 minutes

Shinemnp

**2F, 607-20, Yeoksam-dong, Gangnam-gu, Seoul, Rep of KOREA**

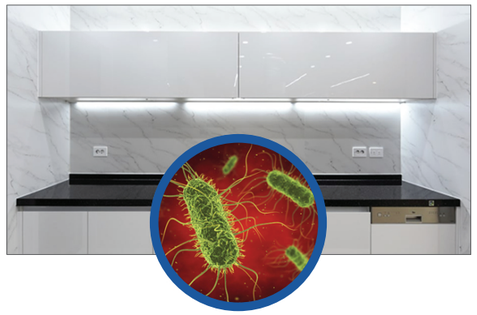
**www.cleanedge.co.kr**

# CLEAN SINK

## Visible Light Sterilization Kitchen Auxiliary Lighting


## Visible light sterilization kitchen aids, which can kill up to COVID-19 protect you from harmful bacteria in space by preventing bacterial development and proliferation by simply leaving the light on.

Clean Sink's visible light sterilization kitchen assistant lights are applied by Violets, a new concept clean technology used by NASA's International Space Station.



General LED kitchen assistant lighting cannot prevent the proliferation of infectious harmful bacteria and viruses and has no sterilizing effect.

Clean Sink's visible light sterilization kitchen assistant light is 405nm wavelength to prevent the disappearance and proliferation of COVID-19 viruses and infectious harmful bacteria.

maltani

# CLEAN SINK (Visible Light Sterilization Kitchen Auxiliary Lighting)


SIZE (mm)

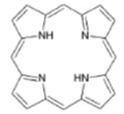

## Products Spec.

| Model NO. | To connect to power method | Power (W) | CCT(K) | CRI (Ra) | Size (mm) | Weight (kg) | Input Voltage (VAC/Hz) |
|---|---|---|---|---|---|---|---|
| S-CLP2910-30-C001 | Directly installed | 28.5W(sterile lamp)+10W(general lamp) | 3,000 | ≥ 80 | L653× W42 × H26 | 0.95 | AC 200-250 50/60 |
| S-CLP2910-40-C001 | Directly installed | 28.5W(sterile lamp)+10W(general lamp) | 4,000 | ≥ 80 | L653× W42 × H26 | 0.95 | AC 200-250 50/60 |
| S-CLP2910-50-C001 | Directly installed | 28.5W(sterile lamp)+10W(general lamp) | 5,000 | ≥ 80 | L653× W42 × H26 | 0.95 | AC 200-250 50/60 |
| S-CLP2910-30-C002 | Built-in furniture type | 28.5W(sterile lamp) | 3,000 | ≥ 80 | L653× W42 × H26 | 0.75 | AC 200-250 50/60 |
| S-CLP2910-40-C002 | Built-in furniture type | + | 4,000 | ≥ 80 | L653× W42 × H26 | 0.75 | AC 200-250 50/60 |
| S-CLP2910-50-C002 | Built-in furniture type | 10W(general lamp) | 5,000 | ≥ 80 | L653× W42 × H26 | 0.75 | AC 200-250 50/60 |

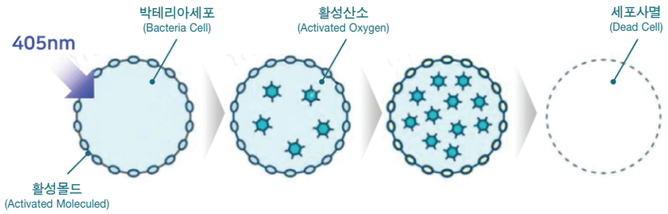
## Maltani Visible Light Sterilization Kitchen Auxiliary Lighting Sterilization Mechanism

(Unlike UV Sterilization Method, Sterilization Mechanism Harmless to Human Body)

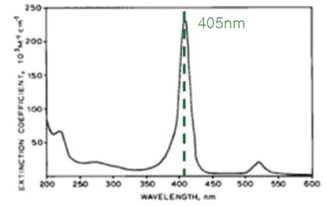
- Utilize visible light sterilization principles
  Poppyrene Reactive (405nm)
- The 405 nm irradiation reacts with the "popirin" in bacteria.
  (porphyrin excitation) → Reactive oxygen species
  (Oxygen) Destroy cells by creating an.




* Poppyrene
405 nm reactant present in bacteria




<Popyrin Absorbance Curve>

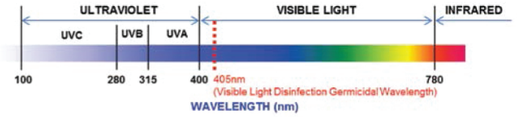



* 출처 : A journal published by Johnson Matthey Plc.

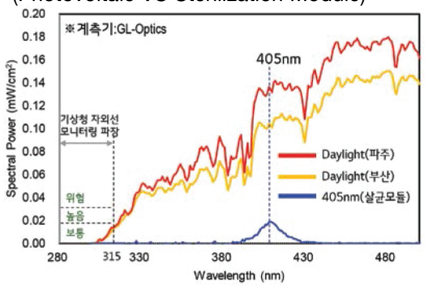
## Comparison of sterilization methods by wavelength

| Sortation | UVC (100~280nm) | UVB (280~315nm) | UVA (315~400nm) | 405nm (Visible Light Region) |
|---|---|---|---|---|
| Characteristics | •Sterilize in a short period of time<br>•Burn bacteria and viruses to death<br>Light source cannot be used directly in the form of exposure<br>• Damage to eyes or skin<br>(Exposure to a 253 nm shortwavelength light source may cause DNA destruction, skin cancer) | • Sterilizable<br>• Direct use in light source<br>• exposure form is not possible<br>Damage to eyes or skin | • Direct use in light source<br>• exposure form is not possible<br>• Damage to eyes or skin<br>Direct sterilization not possible | •Non-contact sterilization<br>•The 405nm reactant in bacteria, the poppirin, is decomposed.<br>•Thus, the sterilization method in which the cells of bacteria on the surface of the light are destroyed.<br>Germs are killed in proportion to survey time<br>No human impact. |
| Human Impact Diagram | Direct exposure changes the structure of DNA, which is harmful to the human body. | | | |

## Visible light contact sterilization




## Spectrum Comparison (Photovoltaic VS Sterilization Module)




## Percentage of bacteria sterilized over time

| Test strains | Sterilization rate over time | Sterilization rate over time |
|---|---|---|
| | Distances from strains and visible light sterilization kitchen aids - 50 cm | Distances from strains and visible light sterilization kitchen aids - 1 m |
| | After 6 hours | After 24 hours |
| E. coli | 97.6 % | 99.9 % |
| Staphylococcus aureus | 97.6 % or higher | 99.9 % |
| Pneumonia | 97.6 % or higher | 99.9 % |
| MRSA (antibiotic resistant bacteria)) | 97.6 % or higher | 99.9 % |