



**UV
STERILIZER**



DS10

ESCALATOR
HANDRAL

**UV
STERILIZER**

Advanced
UV-C Sterilizing
Technology

Devices&Circuit

ESCALATOR HANDRAL

DS10

HANDRAIL UV STERILIZER

'DS10' HANDRAL
UV STERILIZER FOR
ESCALATORS &
MOVING WALK

SAMPLE INSTALLATION
PICTURES @ GENTING
HIGHLANDS



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UV STERILIZER

INSTALLATION VENUES

- SUBWAYS
- PUBLIC VENUES
- AIRPORTS
- SHOPPING MALLS



SUBWAYS



PUBLIC VENUES



AIRPORTS



SHOPPING MALLS



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UV STERILIZER

KEY Features



Self-powered

DS10 has a unique self-powered generating system that does not require an external power source. It is a wireless device that draws power from the movement of the escalator handrails in either direction, converting it into electricity at no additional cost. The rotational movement of the handrails is converted into low voltage DC electricity to power the unit.



Ultraviolet (UV-C) Sterilization-278nm

DS10 is proven to eliminate 99.9% of germs, bacteria, pathogenic diseases and viruses on the surface of handrails through a process known as "Ultra-violet Germicidal Irradiation" (UVGI), a disinfection method that uses short-wavelength ultraviolet (UV-C) that emits rays at a wavelength of 278nm to eliminate or inactivate micro-organisms by eradicating its nucleic acid and disrupting its DNA, resulting in the inability to perform vital cellular functions. This eliminates the use of chemical detergents and disinfectants altogether. This method of UV-C sterilization does not cause harm or physical damage to the handrails, instead it preserves the surface of the handrails.



99.9% Sterilization Rate

DS10 achieves a 99.9% sterilization efficiency rate in just 5 seconds through its newly enhanced 25mW UV-C LED chips. The device is proven to eliminate viruses such as E. coli, Influenza A Virus Sub-type H1N1, Coronaviruses, MERS, SARS and HFMD. Clinical studies have proven that UV-C at a wavelength of 253.7nm is effective enough to eliminate the COVID-19 virus. Internal studies conducted utilizing 10mW UV-C LED chips showcased a 99.9% sterilization rate at eliminating the COVID-19 virus. By way of comparison, our sterilizers utilize 10 built-in 25mW UV-C LED chips which further enhances the sterilization rate.



Easy To Install, Maintain And Operate

DS10 is a 'plug-and-play' device that can be easily attached to the handrail balustrades. The mechanism and procedures for installation and removal has been made to be user-friendly. No drilling or modifications are required on existing escalators and moving walk.



UV-C life cycle Of More Than 10,000 Hours

DS10 UV-C LED modules are recommended to be replaced only after 10,000 hours of usage.

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NEW MODEL
LINE-UP



GLASS TYPE

For glass type
balustrade escalators/
moving walk.



SUS TYPE

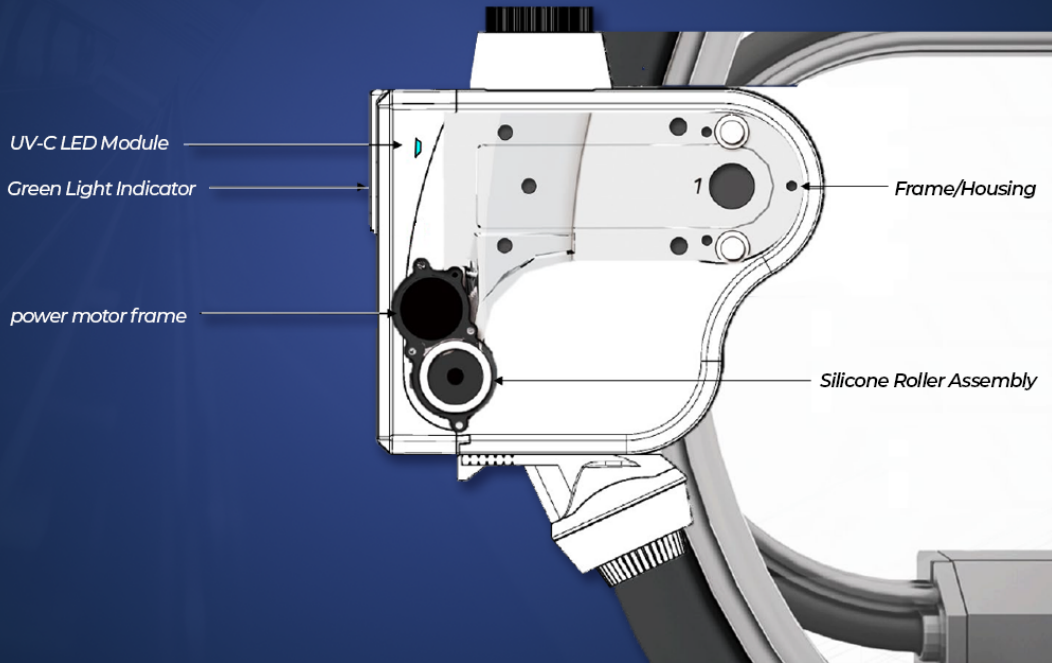
For stainless steel type
balustrade escalators/
walkways.

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PRODUCT STRUCTURE



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PRODUCT FEATURES



Top safety brush to prevent any pinch points

Flame retardant plastic to minimize the risk of fire spreading

Wide cover design for added safety



25mW UV-LED chips (5chips per module x 2) for stronger and enhanced sterilization

Bottom safety brush to prevent any pinch points

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SPECIFICATIONS



| MODEL | Glass type | SUS type |
|---------------------------------|---|---|
| | | |
| PRODUCT | Escalator Handrail UV Sterilizer | Escalator Handrail UV Sterilizer |
| DIMENSIONS | 130 x 350 x 270mm | 150 x 350 x 190mm |
| WEIGHT | 2.6kgs | 1.9kgs |
| COLOUR | Black | Black |
| OUTER COVER MATERIAL | ABS/ AF365F (Flame Retardant) | ABS/ AF365F (Flame Retardant) |
| FRONT COVER SURFACE FINISHING | Matte Black | Matte Black |
| SIDE PANEL(S) SURFACE FINISHING | High Gloss Black | High Gloss Black |
| GENERATOR DC OUTPUT | 10V 3~3.2W (Handrail Speed 25 – 40 meter/min) | 10V 3~3.2W (Handrail Speed 25 – 40 meter/min) |
| UV -C LED CHIPS | 25mW LED Chips x 10EA | 25mW LED Chips x 10EA |
| PEAK WAVELENGTH | UV-C 278nm | UV-C 278nm |
| UV -C CYCLE | 10,000 Hours of Usage | 10,000 Hours of Usage |

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COMPARISON BETWEEN UV STERILIZATION AND OTHER STERILIZATION METHODS

| | <i>UV Sterilization</i> | <i>Heat Sterilization</i> | <i>Ozone Sterilization</i> | <i>Chemical Sterilization</i> | <i>Radiation Sterilization</i> |
|----------------------------------|--|----------------------------------|---------------------------------|----------------------------------|----------------------------------|
| Sterilization of mycetoma | Effective against all | Effective against all | Effective against all | Effective against specific | Effective against all |
| Bactericidal change | Little change | Occasional | Occasional | Occasional | Little change |
| Permeability | No permeability (except air and water) | Effective even inside the object | Effective on the object surface | Effective even inside the object | Effective even inside the object |
| Sterilization Time | Short | Considerably | Long | Considerably | Short |
| Usage | Easy | normal | Difficult | Easy | Difficult |

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MAIN
COMPONENTS

Device & Circuit



Green Light Indicator
To indicate that 'DS10' is in operation



UV-C LED Module
Sterilizes and eliminates various
pathogenic diseases and viruses.

Power Motor
Converts the rotational movement
of the handrail into electricity



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PRINCIPLE OF OPERATION



01.

The main body is attached to the escalator balustrade.



02.

The silicone roller comes into contact with the handrail.



03.

Power is generated by the rotational force of the handrail.



04.

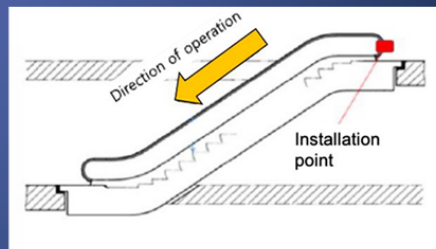
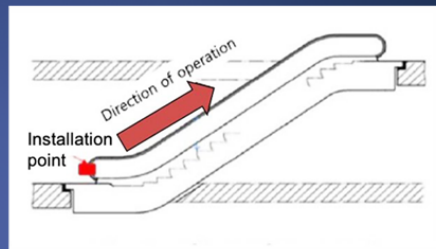
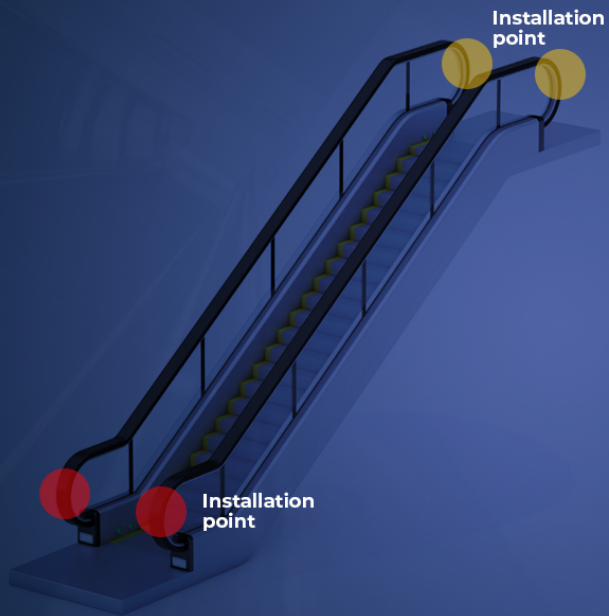
Power produced activates the Green Light Indicator and UV LED modules.

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INSTALLATION POSITION



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TEST REPORT
- 99.9%
STERILIZATION
RATE

TEST REPORT

No : CT21-021956

| Test Items | Test method | Test Results | | Reduction rate (%) | Testing Environment |
|---|--|----------------------|--------------------------|--------------------|---------------------|
| | | Early Conc. (CFU/mL) | After 5 s Conc. (CFU/mL) | | |
| Antibacterial test : <i>Staphylococcus aureus</i> | BLANK | 1.0×10^8 | 1.0×10^8 | - | (37.0 ± 0.2) °C |
| | UV-LED [HoldSafe (Escalator Handral Sterilizer)] | 1.0×10^8 | < 10 | 99.9 | |
| Antibacterial test : <i>Klebsiella pneumoniae</i> | BLANK | 1.1×10^8 | 1.1×10^8 | - | (37.0 ± 0.2) °C |
| | UV-LED [HoldSafe (Escalator Handral Sterilizer)] | 1.1×10^8 | < 10 | 99.9 | |

- CFU : Colony Forming Unit
- Test bacteria : *Staphylococcus aureus* ATCC 6038
Klebsiella pneumoniae ATCC 4962
- Sample : UV-LED[HoldSafe(Escalator Handral Sterilizer)]
- Client's requirement method
 - Test time : 5 seconds
 - Distance between of the medium inoculated with the bacteria and lamp of the sample : 1 cm
- Client's requirement information (Sample's operating time)
 - 1 time operation : 0.25 seconds
- Inoculum preparation, Inoculation method, Assessment of Results : KCL-FIR-1002-2018 Mod.
- Location : unit108, Industry-Academic Cooperation Foundation, Hanyang National University, 327, Jungang-ro, Ansan-si, Gyeonggi-do, 17579, Korea

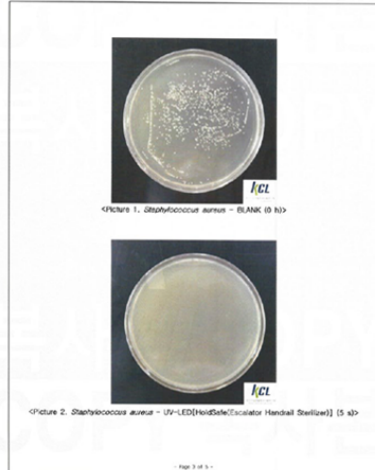
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TEST REPORT

No : CT21-021956



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T2P-12-01-04(1)



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HANDRAIL UV STERILIZER

TEST REPORT
- 99.9%
**STERILIZATION
RATE**



Page : 3 of 4
Work Order : [REDACTED]
Client : [REDACTED]
Project : [REDACTED]



Analytical Results

| Sub-Matrix: SWAB | | | | PRE-STERILIZATION (RIGHT HANDRAIL)-A | PRE-STERILIZATION (RIGHT HANDRAIL)-B | PRE-STERILIZATION (LEFT HANDRAIL)-A | PRE-STERILIZATION (LEFT HANDRAIL)-B | POST STERILIZATION (RIGHT HANDRAIL)-A |
|--------------------------------|---------|-----|----------|---|---|--|--|--|
| Compound | Method | LOR | Unit | MF2220720-001 | MF2220720-002 | MF2220720-003 | MF2220720-004 | MF2220720-005 |
| Microbiological Testing | | | | | | | | |
| Total Plate Count | MB17-81 | 1 | CFU/swab | 22 | 5 | 11 | 32 | <1 |

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Work Order : [REDACTED]
Client : [REDACTED]
Project : [REDACTED]



Analytical Results

| Sub-Matrix: SWAB | | | | POST STERILIZATION (RIGHT HANDRAIL)-B | POST STERILIZATION (LEFT HANDRAIL)-A | POST STERILIZATION (LEFT HANDRAIL)-B | ---- | ---- |
|--------------------------------|---------|-----|----------|--|---|---|-------|-------|
| Compound | Method | LOR | Unit | MF2220720-006 | MF2220720-007 | MF2220720-008 | ----- | ----- |
| Microbiological Testing | | | | | | | | |
| Total Plate Count | MB17-81 | 1 | CFU/swab | <1 | <1 | <1 | ---- | ---- |

Model NO. **DS10**



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