



CMA Testing and Certification Laboratories

廠商會檢定中心

Report No. : AZ [REDACTED]

Application No. : LZ [REDACTED]

Risk Assessment on The Escalator Handrail Sanitizing and Cleaning System (ClearWin)

Site Location	[REDACTED]
Escalator No.	No. 5, 3rd floor
Client	[REDACTED]
Report No.	CMA – Handrail Safety_042020
Date	15 April, 2020
Prepared by	Coleman Tse
Reviewed By	_____


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1. Background

Escalators handrails are frequently touched by the passengers and would contribute the risk of spreading virus to the passengers especially under the current epidemic situation of HK.

The escalator handrail belt cleaning system which serves as a means of sterilizing the handrail belt of escalators to prevent spreading of virus to the passengers whilst using of the escalators.

CMA Testing and Certification Laboratories was commissioned by [REDACTED] Limited to carry out a risk assessment study on the installation of escalator handrail belt sterilizer at escalators no. 5 on the 3rd floor of [REDACTED].

The main purpose for the study is to identify the potential safety risks to the installers, operators and the passengers for the installation, operation and maintenance of the system.

2. Scope of Work

- a. To review and study the ClearWin sterilizer's specifications, installation manual, technical information and testing reports for the product safety and quality assurance etc.
- b. To carry out on site study to identify the risk for the installation and operation of the sterilizer
- c. To prepare and issue an independent risk assessment report including risk description, risk level, recommendations for risk mitigation for the specific escalator in [REDACTED]



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3. Specifications and Installation of the Escalator Handrail Cleaning System

ClearWin is a manufacturer to provide escalators' handrail cleaning system (Sterilizer) for the escalator to enhance the hygiene and prevent spread of virus to the passengers when travelling on the escalators. The sterilizer uses Ultraviolet lamp for sterilizing the handrail belt.

The power for operating the sterilize is self-generated through the mechanism contacting with the moving handrail of the escalator which enhance a fail-safe feature when the escalator is stopped operation. Below are the specifications of the sterilizer.

ClearWin		Specification
size (W×H×D) mm		130×220×260
weight(kg)		1.8kg
outside cover	material	ABS-AF312 flame retardant
	surface finish	high-glossy painting
	color	black & white
generator	DC output	8-10 Volt
UV-C led module	power consumption	300 mA
	wave length	UV-C:278 nm
	lifespan	10,000 hours

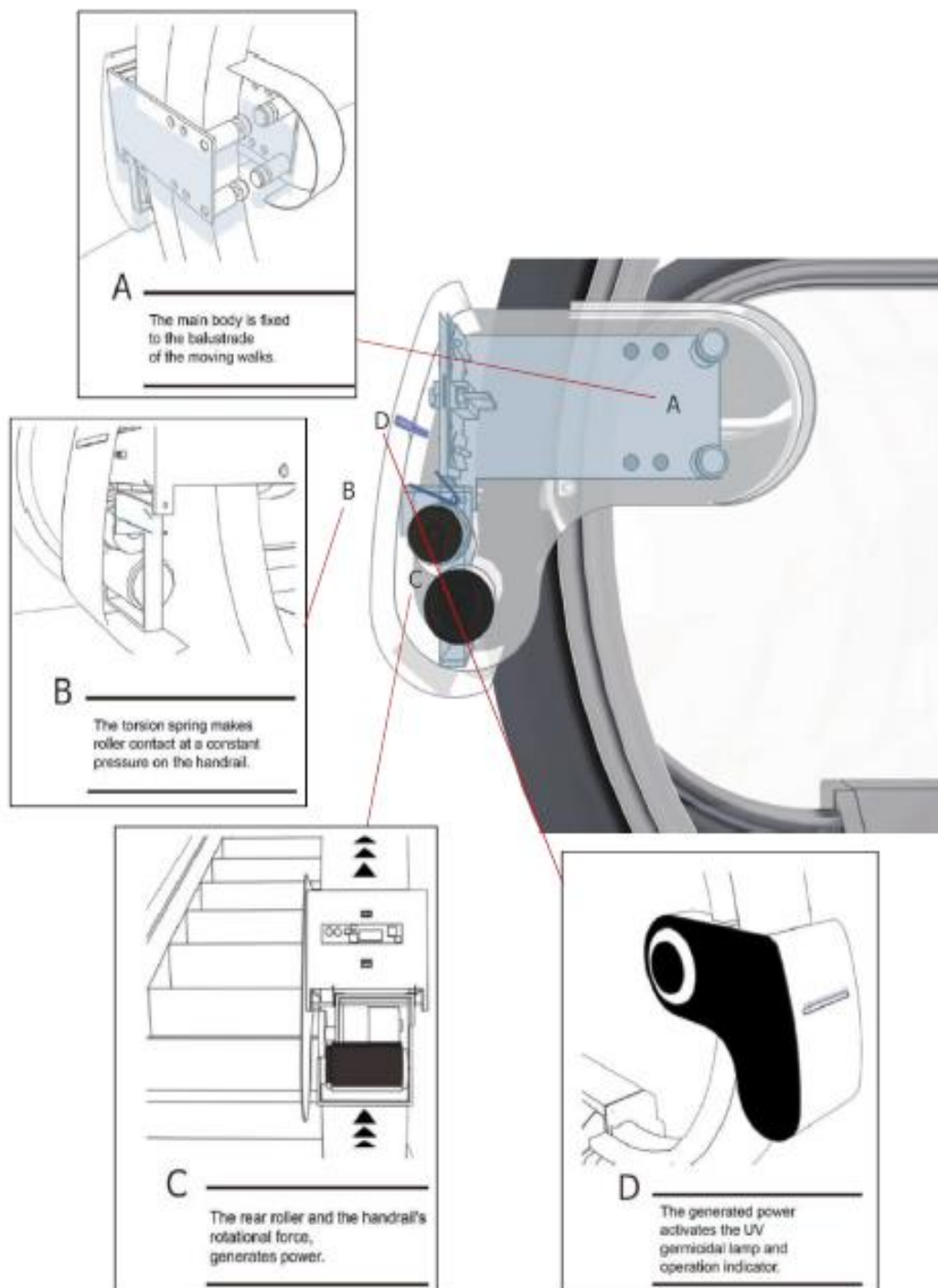


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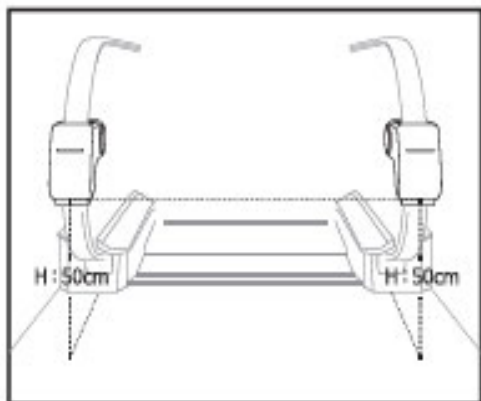


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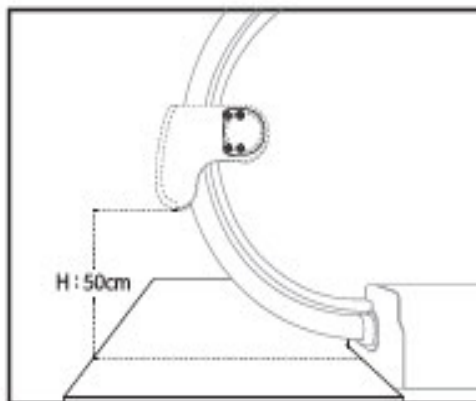
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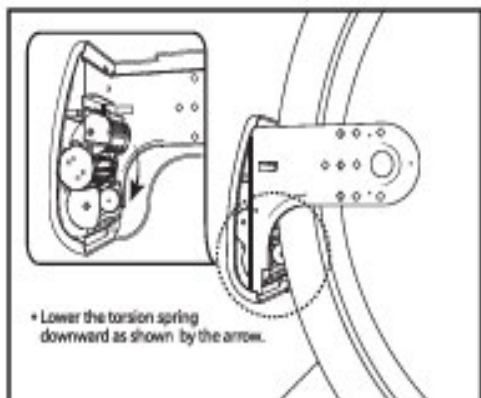
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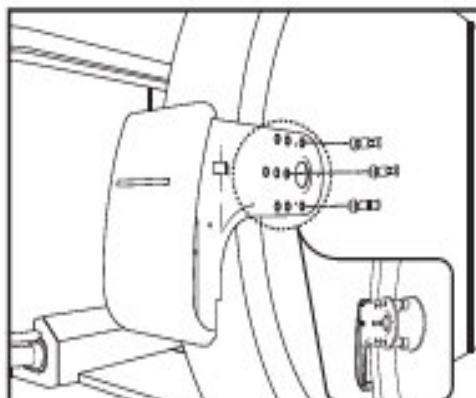
① It is installed within 50CM of the escalator platform tier finish from the base of the clearwin main body.



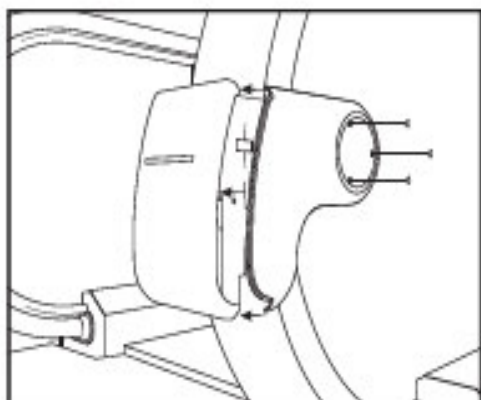
② Install the bracket on the platform stainless panel, according to the measured position.



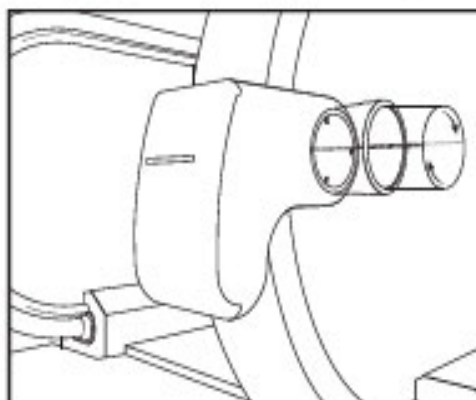
③ The torsion spring contacts the handrail with the roller at a constant pressure.



④ Keep the body on the escalator while maintaining the pressure to turn on the operation lamp.



⑤ After inserting the side cover into the clearwin body as shown in the figures, fix the cover and main body with screws.



⑥ Insert the side plug ring first, and turn the side plug along the clockwise direction.



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Key components for Installation

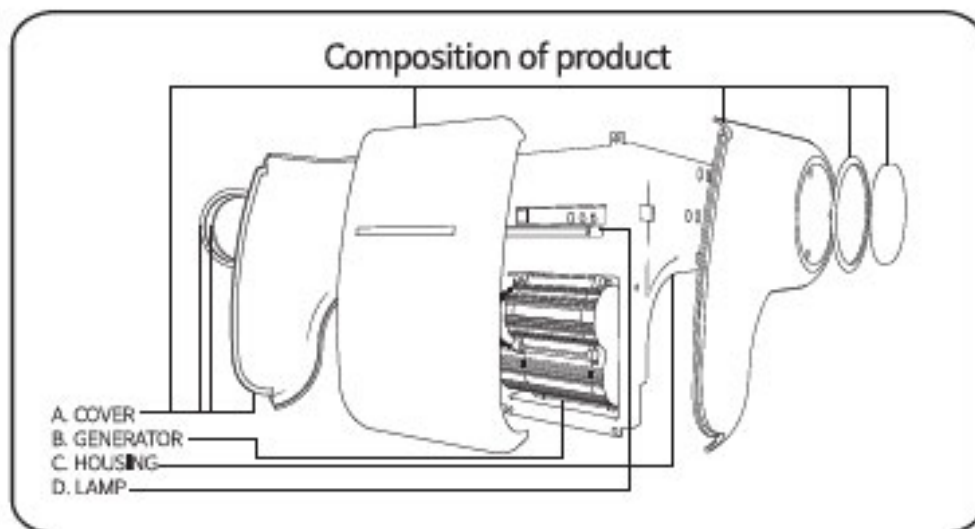


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HOUSING FRAME



FRONT COVER



RIGHT COVER



LEFT COVER



BRACKET × 2EA



CCFL × 2EA



COVER RING × 2EA



COVER CAP × 2EA



STATUS LAMP



LAMP PCB



LAMP COVER



MAIN PCB



GENERATOR



SILICON COVER



BOLT / COVER SCREW



VHB



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3.1 Brief description for Installing of the sterilizer to the escalator

As the installation of the sterilizer to the balustrade of the escalators is the critical process, please find a brief description of the process.

The bracket as shown in the above diagram serves to mount the entire sterilizer to the balustrade of the escalators. Two brackets are attaching to the both size of the glass panel of the balustrade of the escalators by 3M VHB double-sided adhesive tape. 2 mount posts are fixing to bracket on each side of the glass panel through screw in the screw nuts on the brackets. 2 double end threaded screws are screwed to the threaded end of the installed posts. Additional posts are then connected to the end side of the double sides threaded screws to double height of the connecting posts. The main body of the sterilizer is then fixing to the bracket through screw bolts.



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4. The Risk Assessment

The rationale for carrying out the study of risk assessment is to uncover the underlying risk factors inducing additional hazards and potential risks to the passengers and other stakeholders that may operate and maintenance of the escalators due to the installation and operation of handrail sterilizer to an escalator. The risk assessment focuses particularly the safe of passengers, workers and operators. Mitigation measures in respect of varying identified consequence levels of hazards will be recommended and included in this report. Countermeasures including modifications to the design or addition of facilities to reduce the risk level of hazards to an acceptable level is required.

The analysis of qualitative risk is based on a typical 5*5 matrix with reference to AS/NZS 4360: 2004. The main parameters to be considered are the severity of the consequences and likelihood that an incident will occur, each of them has 5 levels to form a 5*5 matrix together and assess the level of risk, as illustrated in the following table.

Table 1. Qualitative description of likelihoods.

Likelihood level Definition
1 Highly unlikely May occur only in very exceptional circumstances.
2 Unlikely to occur in most circumstances.
3 Possible May occur in some circumstances.
4 Very likely May occur in most circumstances.
5 Almost certain Expected to occur in most circumstances.



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Factors/control likelihood level	Consequence level				
	1 Very low	2 Low	3 Medium	4 High	5 Severe
1 Highly unlikely	1	1	1	2	2
2 Unlikely	1	2	2	3	3
3 Possible	1	2	3	4	4
4 Very likely	2	3	4	4	5
5 Almost certain	2	3	4	5	5

Table 2. Qualitative description of consequences.

Consequence Level Definition

1 Very low Consequence is negligible.

2 Low Consequence is minor and can be easily rectified.

3 Medium Consequence is moderate and can be rectified.

4 High Consequence is high and has significant impact.

5 Severe Consequence is extreme, rectification is impossible or will take a long



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5. Risk Assessment for Installation & Operation of Cleaning System

5.1. The sterilizer including its parts and working mechanism and the specifications, testing reports, certification, components specifications and processes for installation and operation were basically reviewed.

5.2. The risk assessment regarding the installation and operation of the sterilizer was reviewed and shown in Appendix A of this report.

5.3. In general, several considerations which include the **EMSD guidance Circular No. 6/2019, Guidance on Incorporation of Handrail Cleaners into Escalators**, were drawn in the table of risk assessment. Most of them are minor risks in nature and which can be mitigated with simple measures. Therefore, it is concluded that no adverse comment for the ClearWin sterilizer install for specified type of escalator in [REDACTED] with the required performance based on the information provided by the supplier, registered escalator contractor and the management office.



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Appendix I – Risk Assessment Report



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Item	Potential Risk	Likelihood	Severity	Consequence Level	Recommended Remedial Measures
1	Risk of pinching and trapping of passenger's fingers or clothing in the clearance between handrail belt of escalator and the sterilizer.	1	4	2	<p>The gap between handrail of escalator and the sterilizer to be checked regularly to ensure less than 4mm during routine maintenance of the sterilizer.</p> <p>Provide instruction and training to the related personnel that the escalator is set in the direction moving outward from the opening of the sterilizer to prevent channel the passenger's finger(s) to the machine.</p> <p>The sterilizer installation services provider will be contacted for removing and reinstalling of the sterilizer if running direction of the escalator need to be changed for any reason.</p>
2	Risk of trapping between sterilizer and the balustrade of the escalator.	1	4	2	<p>Provide proper training to alert the workers to seal all trapping gap when installation of the sterilizer and/or provide mistake proofing mechanism by setting the direction of the escalator's moving direction and location of installing of sterilizer</p>
3	Possible breakage of the sterilizer and creation of sharp point or cutting edge.	1	4	2	<p>No damage was found refer to result of test report, (ref.: report no. TH18KR-2095S), of impact test (EN60950-1:2006 /A2:2013) by laboratory. Regular inspection is required to assure there is no sign of actual or potential damage found at sterilizer enclosure</p>
4	Risk of collision into the sterilizer by passenger's or belongings.	2	2	2	<p>Reflective or luminous tapes to be provided in the eye-catching position to alert passenger's attention.</p>
5	Hindrance to escalator emergency stop switch	1	5	2	<p>Provide proper training to the workers to ensure the location selected for installation of the sterilizer will not hinder the emergency stop switch.</p>



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Item	Potential Risk	Likelihood	Severity	Consequence Level	Recommended Remedial Measures
6	Risk of exposure of sterilizer's internal moving or rotary parts and ultraviolet light.	1	4	2	Provide training and work instruction to workers regarding the procedures to stop the operation of the escalator for the installation and maintenance operations. Workers or operators shall need to ensure the indicating light on the front cover of the Sterilizer is off before removing the covers of the sterilizer.
7	Risk of damage the structure of balustrade of escalator during installation of sterilizer.	2	3	2	Method statement and proper installation training provide to the workers before installation. Record(s) of training is maintained to proof workers' competency Ensure appropriate insurance coverage is in place for due diligence.
8	Collapse of sterilizer due to poor installation work or maintenance work.	1	5	2	To provide training and installation & maintenance manual for the relevant workers. Record(s) of training is maintained to proof workers' competency Ensure appropriate insurance coverage is in place for due diligence.
9	Misuse of sterilizer by passengers	1	3	1	Provide training to the operation and customer service staff to ensure they are competent to guide the passengers proper use of the sterilizer.
10	Doubled side adhesive detached from the balustrade	2	3	3	Ensure the processes to apply the double- sided adhesive tape to the balustrade strictly follow the doubled sides tape's manufacturer's recommendations. Define the cycle time for replacing the double- sided adhesive