

DISINFECTION SYSTEM

This invention, UVC Disinfection System, relates generally to the:

1. addition of UVC lamp in the Lighting Unit of the bus and/or
2. addition of UVC lamp in the bus (“UVC Lamp Unit”)

for the purpose of disinfection of the bus whenever required.

This invention, which can be installed in all existing and new bus, provides a sustainable and chemical free solution to keeping the bus hygienically clean, reducing risk of infection for the passengers of the bus and reducing aversion against usage of the bus. This will increase confidence and encourage usage of the public bus system especially during a pandemic like Covid-19.

General

Unless the context otherwise requires, references to the singular number shall include references to the plural number and vice versa.

Background

The use of ultraviolet light is becoming more widely used in healthcare facilities for disinfecting patient and operating rooms.

According to the World Health Organisation, the three types of UV radiation are classified according to their wavelength. They differ in their biological activity and the extent to which they can penetrate the skin. The shorter the wavelength, the more harmful the UV radiation. However, shorter wavelength UV radiation is less able to penetrate the skin. Short wavelength ultraviolet (“UVC”) is the most damaging type of UV radiation. However, it is completely filtered by the atmosphere and does not reach the earth’s surface.

UVC light cannot pass through any solid material. The benefits of using UVC light for disinfection can be maximised without harming any human being by containing the UVC light in an enclosure made of solid material and making sure that there are no human being in the enclosure.

Modern science has been able to create UVC light that is able to penetrate the cell wall of microorganisms such as bacteria and viruses including coronavirus and alter their DNA structure such that the microorganism becomes nonviable, unable to reproduce and/or infect a human being.

Results have proven that UVC light exposure to the air and surrounding surfaces disinfect and reduce the number of microorganisms such as bacteria and viruses including coronavirus,

helping to fight and cut transmission of microorganisms such as bacteria and viruses including coronavirus.

By introducing UVC light into the bus, the UVC light will disinfect and reduce the number of microorganisms such as bacteria and viruses including coronavirus in the air and surfaces in the bus. This addition and/or improvement, which can be installed in all existing and new bus, provides a sustainable and chemical free solution to keeping the bus hygienically clean, reducing risk of infection for the passengers of the bus and reducing aversion against usage of the bus. This will increase confidence and encourage usage of the public bus system especially during a pandemic like Covid-19.

Lighting Unit Of Bus

The main purpose of the Lighting Unit of the bus is for internal illumination.

There are generally two rows of Lighting Units in each bus. Each row is on each side of the bus.

Each Lighting Unit includes at least one lamp, which may be fluorescent, light emitting diode or others. All Lighting Unit are connected and controlled by the memory module and software application of the bus.

Addition Of UVC Lamp In The Lighting Unit Of Bus

The Lighting Unit of the bus will be modified to allow addition of one or more UVC lamp and/or infrared mechanism. The specification and number of UVC lamp as well as infrared mechanism will be dependent on the size of the bus and the Lighting Unit. All Lighting Unit are connected and controlled by the memory module and software application of the bus. However, the UVC lamp and infrared mechanism in the Lighting Unit of the bus can only be controlled by the bus central command centre via remote control.

UVC light cannot pass through any solid material. The UVC lamp cover which is made of solid material such as opaque plastic will cover the UVC lamp when the UVC lamp is not activated. The UVC lamp cover will open when the UVC lamp is activated. The bus disinfection enclosure where the bus is to be disinfected is also made of solid material such as opaque zinc sheets.

The UVC lamp and infrared mechanism in the Lighting Unit in the bus can only be activated by the bus central command centre via remote control. The bus disinfection enclosure is monitored via closed circuit television surveillance by the bus central command centre. The bus central command centre can only activate the UVC lamp and infrared mechanism after ensuring that there is no human being in the bus disinfection enclosure and in the bus. The bus disinfection enclosure will be locked during the disinfection process by the bus central command centre via remote control. The bus central command centre will unlock the bus disinfection enclosure and provide access only after the disinfection process. This prevents exposure of UVC light to any human being.

Upon activation of the UVC lamp, the infrared mechanism will scan the bus and ensure that there is no movement in the bus before allowing the UVC lamp to be turned on. After the UVC lamp is turned on, the infrared mechanism will continue to operate and turn off all UVC lamps in the bus if there is the slightest movement in the bus and the bus central command centre will also be alerted. This additional precaution prevents exposure of UVC light to any human being.

The bus driver will drive the bus into the bus disinfection enclosure, inform the bus central command centre and leave the bus disinfection enclosure. After disinfection of the bus and permission is granted by the bus central command centre, the bus driver will return back to the bus and proceed with the next bus journey or drive the bus to the bus parking area. The bus may be disinfected after every journey.

The UVC lamp will disinfect and reduce the number of microorganisms such as bacteria and viruses including coronavirus in the air and surfaces in the bus. The bus can be disinfected whenever required. The period of disinfection will depend on the size of the bus, the specification of UVC lamp used etc. The UVC lamp will turn off automatically after the period of disinfection.

This invention, which can be installed in all existing and new bus, provides a sustainable and chemical free solution to keeping the bus hygienically clean, reducing risk of infection for the passengers of the bus and reducing aversion against usage of the bus. This will increase confidence and encourage usage of the public bus system especially during a pandemic like Covid-19.

Addition Of UVC Lamp Unit

The UVC Lamp Unit is separate from the Lighting Unit. One or more UVC Lamp Unit can be added to the bus if it is not viable to add one or more UVC lamp and/or infrared mechanism to the Lighting Unit of the bus. The specification and number of UVC lamp as well as infrared mechanism in the UVC Lamp Unit will be dependent on the size of the bus and the UVC Lamp Unit. All Lighting Unit are connected and controlled by the memory module and software application of the bus. However, the UVC Lamp Unit of the bus can only be controlled by the bus central command centre via remote control.

The UVC Lamp Unit may also be added instead of adding UVC lamp and infrared mechanism to the Lighting Unit of the bus if the owner and/or manufacturer of the bus prefer such an arrangement.

The main purpose of the Lighting Unit is for internal illumination while the UVC Lamp Unit is to disinfect the air and surfaces in the bus of microorganisms such as bacteria and viruses including coronavirus.

UVC light cannot pass through any solid material. The UVC Lamp Unit cover which is made of solid material such as opaque plastic will cover the UVC Lamp Unit when the UVC Lamp Unit is not activated. The UVC Lamp Unit cover will open when the UVC Lamp Unit is activated. The bus disinfection enclosure where the bus is to be disinfected is also made of solid material such as opaque zinc sheets.

The UVC Lamp Unit in the bus can only be activated by the bus central command centre via remote control. The bus disinfection enclosure is monitored via closed circuit television surveillance by the bus central command centre. The bus central command centre can only activate the UVC Lamp Unit after ensuring that there is no human being in the bus disinfection enclosure and in the bus. The bus disinfection enclosure will be locked during the disinfection process by the bus central command centre via remote control. The bus central command centre will unlock the bus disinfection enclosure and provide access only after the disinfection process. This prevents exposure of UVC light to any human being.

Upon activation of the UVC Lamp Unit, the infrared mechanism will scan the bus and ensure that there is no movement in the bus before allowing the UVC lamp to be turned on. After the UVC lamp is turned on, the infrared mechanism will continue to operate and turn off all UVC lamps in the bus if there is the slightest movement in the bus and the bus central command centre will also be alerted. This additional precaution prevents exposure of UVC light to any human being.

The bus driver will drive the bus into the bus disinfection enclosure, inform the bus central command centre and leave the bus disinfection enclosure. After disinfection of the bus and permission is granted by the bus central command centre, the bus driver will return back to the bus and proceed with the next bus journey or drive the bus to the bus parking area. The bus may be disinfected after every journey.

The UVC Lamp Unit will disinfect and reduce the number of microorganisms such as bacteria and viruses including coronavirus in the air and surfaces in the bus. The bus can be disinfected whenever required. The period of disinfection will depend on the size of the bus, the specification of UVC lamp used etc. The UVC Lamp Unit will turn off automatically after the period of disinfection.

This invention, which can be installed in all existing and new bus, provides a sustainable and chemical free solution to keeping the bus hygienically clean, reducing risk of infection for the passengers of the bus and reducing aversion against usage of the bus. This will increase confidence and encourage usage of the public bus system especially during a pandemic like Covid-19.

Brief Description Of The Drawings

The invention will be better understood by reference to the following drawings in which:

Figure 1 shows the legend for Figures 2A, 2B, 3A and 3B.

Figure 2A shows addition of a UVC lamp in the Lighting Unit of the bus with UVC lamp cover opened.

Figure 2B shows addition of a UVC lamp in the Lighting Unit of the bus with UVC lamp cover closed.

Figure 3A shows a UVC Lamp Unit of the bus with UVC lamp cover opened.

Figure 3B shows a UVC Lamp Unit of the bus with UVC lamp cover closed.

Figure 4 shows a bus disinfection enclosure made of solid material.

Claims

Therefore, the invention should be limited only by the spirit and scope of the appended claims.

What is claimed is

1. The Lighting Unit provides internal illumination for the bus wherein the improvement comprises of the addition of UVC lamp in the Lighting Unit of the bus which will disinfect and reduce the number of microorganisms such as bacteria and viruses including coronavirus in the air and surfaces in the bus, as and when required. This addition and/or improvement provides a sustainable and chemical free solution to keeping the bus hygienically clean, reducing risk of infection for the passengers of the bus and reducing aversion against usage of the bus. This will increase confidence and encourage usage of the public bus system especially during a pandemic like Covid-19.
2. The Lighting Unit according to claim 1 wherein the improvement comprises of remote activation of the UVC lamp and infrared mechanism in the Lighting Unit of the bus by the bus central command centre. The bus central command centre can only activate the UVC lamp after ensuring that there is no human being in the bus disinfection enclosure and in the bus is an addition and/or improvement that will prevent exposure of UVC light to any human being.
3. The Lighting Unit according to claim 1 wherein the improvement comprises of addition of one or more infrared mechanism in the Lighting Unit of the bus which will scan the bus and ensure that there is no movement in the bus before allowing the UVC lamp in the Lighting Unit to be turned on. After the UVC lamp is turned on, the same infrared mechanism will turn off all UVC lamps in the bus and the bus central command centre will also be alerted if there is the slightest movement in the bus. This addition and/or improvement prevent exposure of UVC light to any human being.
4. The UVC Lamp Unit is separate from the Lighting Unit and can be added to the bus wherein the improvement comprises of addition of UVC Lamp Unit in the bus which will disinfect and reduce the number of microorganisms such as bacteria and viruses including coronavirus in the air and surfaces in the bus, as and when required. This addition and/or improvement provides a sustainable and chemical free solution to keeping the bus hygienically clean, reducing risk of infection for the passengers of the bus and reducing aversion against usage of the bus. This will increase confidence and encourage usage of the public bus system especially during a pandemic like Covid-19.
5. The UVC Lamp Unit according to claim 4 wherein the improvement comprises of remote activation of the UVC lamp and infrared mechanism in the UVC Lamp Unit of the bus by the bus central command centre. The bus central command centre can only activate the UVC lamp after ensuring that there is no human being in the bus disinfection enclosure and in the bus is an addition and/or improvement that will prevent exposure of UVC light to any human being.

6. The UVC Lamp Unit according to claim 4 wherein the improvement comprises of addition of one or more infrared mechanism in the UVC Lamp Unit of the bus which will scan the bus and ensure that there is no movement in the bus before allowing the UVC lamp in the UVC Lamp Unit to be turned on. After the UVC lamp is turned on, the same infrared mechanism will turn off all UVC lamps in the bus and the bus central command centre will also be alerted if there is the slightest movement in the bus. This addition and/or improvement prevent exposure of UVC light to any human being.