

Technical Disclosure Commons

Defensive Publications Series

November 2021

AIR PURIFICATION CASSETTE (UV-C LIGHT) FOR VEHICLE CABINS FOR INTEGRATION INTO EXISTING AIR CONDITIONING CONCEPTS

Axel Unger
Bertrandt Ingenieurbüro GmbH

Follow this and additional works at: https://www.tdcommons.org/dpubs_series

Recommended Citation

Unger, Axel, "AIR PURIFICATION CASSETTE (UV-C LIGHT) FOR VEHICLE CABINS FOR INTEGRATION INTO EXISTING AIR CONDITIONING CONCEPTS", Technical Disclosure Commons, (November 28, 2021)
https://www.tdcommons.org/dpubs_series/4751



This work is licensed under a [Creative Commons Attribution 4.0 License](https://creativecommons.org/licenses/by/4.0/).

This Article is brought to you for free and open access by Technical Disclosure Commons. It has been accepted for inclusion in Defensive Publications Series by an authorized administrator of Technical Disclosure Commons.

AIR PURIFICATION CASSETTE (UV-C LIGHT) FOR VEHICLE CABINS FOR INTEGRATION INTO EXISTING AIR CONDITIONING CONCEPTS

Technical task:

In vehicle cabins with more than one person, no effective aerosol reductions are currently possible. State-of-the-art are particle filters (allergen filters) supplemented with activated carbon filters or nanofibre filters for ultra-fine dust and microbial particles. Further improvement (virus strains) is only possible through the use of HEPA filters.

Initial situation:

Such filters require a large surface area (installation space) and cannot be integrated into existing indoor ventilation concepts (air conditioning and downstream air ducts) or, in the case of a compact design, would have to be replaced at short intervals (costs).

Solution:

Air purification unit with UV-C LEDs arranged in labyrinths. Arranged on the existing air-conditioning unit and in "recirculation" operating mode. A CO₂ and humidity sensor monitor the interior and supply fresh air as needed.

Advantages:

Significant reduction of bacteria and virus strains with a maintenance-free system. Only the current (mostly inexpensive) filters need to be changed at known intervals.

Possible application:

Recirculation mode requires a lower air volume flow in the cabin than fresh air mode. This makes it possible to realise a compact cleaning cassette. This is constructed similarly to a familiar heat exchanger.

Conceptually, the module is constructed in two parts and consists of an "air intake module with integrated UVC light unit" and an air duct for the supply to the existing recirculation air opening of the air conditioning system. Both individual parts can be plugged into the air duct and form the module in the further description. Inside the UVC light unit are UV-C LEDs arranged in rows. (Note: the effect of UV-C light on organisms is assumed to be known).

This unit is attached to the underside of the air-conditioning unit in the area of the air intake (accessibility to customer service for changing air filters) to the existing connection geometries. The existing opening cover of the air filter can be replaced by the module described above. If necessary, the UVC light unit of the module described can be made accessible for cleaning via a simple folding function.

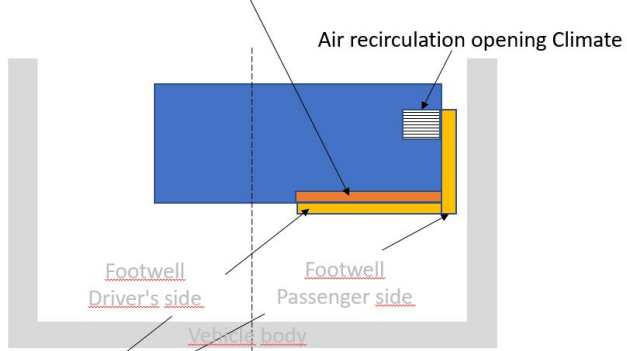
The subsequently attached air duct for the supply of the recirculation air opening is to be fixed to the existing geometries.

In the event of customer service, the "air intake module with integrated UVC light unit" can be removed.

Summary and key statements

- Reduction of aerosol exposure for more than one person
- Recirculation mode
- Compact purification cassette can be integrated into existing air-conditioning concepts
- Operation via UV-C LEDs
- Cleaning unit can be easily maintained

Existing opening for changing the air filter in the customer service area



2) Air duct for feeding the recirculation opening

1) Air intake module with integrated UVC light unit

