

Smart Sleeve Filter - "Revolutionary Solution for Indoor Air Filtration"

Development status

Phase 4

The transition from the prototype to the final and fully functional form. At this stage, the prototype is already fully tested, or the technology is certified and ready for mass deployment.

IP protection status

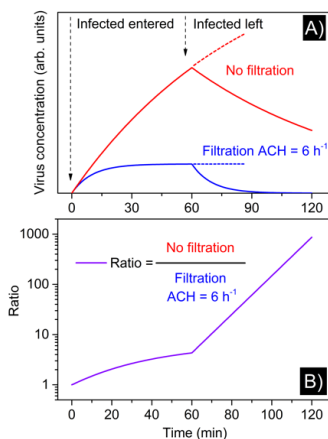
Application PV 2023-182

Application PCT/CZ2024/050022

Partnering strategy

licensing

The importance of air filtration - an example when an infected person entered a filtered or unfiltered room



Challenge

The importance of air filtration is well-established today, not only in industrial settings but also in residential buildings such as hospitals, schools, offices, and homes. In Western society, we spend up to 95 % of our time indoors. Air filtration removes aerosol particles that can be harmful to human health. Potentially harmful aerosol particles include pollen and mold spores (allergen sources), bacteria, viruses (e.g., coronavirus), and dust particles generated by combustion processes (e.g., vehicle emissions). In all industrial processes, air quality is important for the health of people and controlled production processes. With the increasing demand for clean air, it is important to reduce the consumption of electrical energy during filtration, i.e. to reduce the pressure loss of the filter and to optimize the distribution of purified air. Last but not least, emphasize transport costs, storage costs and filter recycling and thus minimize the ecological footprint.

Description

Boldness and rationalization in design have led to a revolutionary air filtration solution characterized by high efficiency, low energy consumption, long lifespan, user comfort, and minimal environmental impact. In our design, the filter is integrated directly into the interior, giving it the same importance as table, chair or a lighting. Our filter solution has an elongated, cylindrical shape, is placed under the ceiling in the room and combines the function of filtration and uniform distribution of purified air in the interior. The designed filter solution effectively captures aerosol particles ranging from a few nanometers to several micrometers in size. The design's simplicity and exposed shape (larger filtration area) result in low pressure loss as air passes through the filter media, leading to reduced energy consumption by the fan compared to conventional filtration solutions. The purified air is homogeneously distributed throughout the room, maintaining thermal comfort. The simplicity of the filter (cylinder) leads to lower manufacturing costs, and the compressibility of the filter (textile material) results in significantly reduced storage and transportation

Institution

University of Pardubice

Vlastník

**Multi-FAS spol. s r.o. &
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costs. These factors are why we refer to our solution as revolutionary. The filter's properties and effectiveness have been tested in collaboration with independent scientific institutions. The prototype has been in continuous operation for two years in a regularly used classroom, maintaining perfect functionality with consistently low energy consumption.

Commercial opportunity

Given the qualities of the proposed solution, including operational cost savings, improved distribution of purified air, and lower transportation and storage costs, our solution has significant potential for entry into existing markets such as industrial production, warehousing, administrative buildings, healthcare, and education. Furthermore, it is an independent solution that can be easily integrated into existing buildings to achieve a level of filtration necessary for extreme conditions such as limiting the transmission of Covid. Air filtration has never been so accessible before. Clean air is a basic condition for health and a controlled production environment.