

SMART AIR PURIFIER

IITM Technology Available for Licensing

Problem Statement

- **Indoor air quality (IAQ)** is a major concern as people spend about 90% of time in indoor environments, where concentrations of many pollutants are frequently higher (up to five times) than in outdoor urban air.
- There is need for **air filter with wide range applicability** in indoor environments like residential, commercial, institutional and industrial localities that **can bring down the pollutant concentrations** and to provide healthy air to the people.

Technology Category/ Market

Category – Environmental Engineering

Applications –Air Purifiers, consumer technology, petrochemicals and manufacturing, industrial air cleaning systems, Clean Energy

Industry – Consumer Technology, Environmental Engineering

Market -The global air purifier market size was estimated at **USD 13.97 billion in 2022** and is anticipated to expand at a compound annual growth rate (CAGR) of **7.3% from 2023 to 2030**.

Key Features / Value Proposition

❖ *Technical perspective*

- ❑ Centrifugal fan is capable of providing **nominal flow rates even with high pressure drops** thereby consuming lesser energy than ordinary axial fans.
- ❑ Filter is filled with media like **HEPA, activated charcoal, activated alumina or naturally occurring zeolites etc.**
- ❑ **Deviator plate** for the outflow to get greater mixing ratio

❖ *User perspective*

- ❑ **Energy –efficient, Portable and require less maintenance cost**
- ❑ **Cost- effective, compact and user-friendly design**
- ❑ **Reusable filter**

Technology

The invention discloses an air purifying device for purifying contaminated air within a space comprising:

a cylindrical body with perforation

a filter with sorbent media placed within the cylindrical body

centrifugal fan for suction of air

a deviator plate uniformly distribute purified air through the space

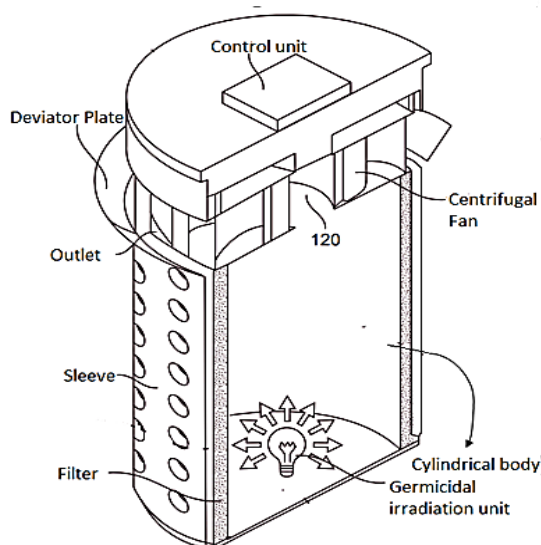


Fig 1 shows the cross sectional view of the design that illustrates the components of a smart air purifier

CONTACT US

Dr. Dara Ajay, Head
Technology Transfer Office,
IPM Cell- IC&SR, IIT Madras

IITM TTO Website:
<https://ipm.icsr.in/ipm/>

Email: smipm-icsr@icsrpis.iitm.ac.in

sm-marketing@imail.iitm.ac.in

Phone: +91-44-2257 9756/ 9719

- ❑ Body and sleeve are configured to be displaced with reference to each other where the body comprises perforations **that open to allow the inflow of contaminated air into the air purifier through the perforations in the outer sleeve**
- ❑ The opening and closing of the perforations is accomplished by a motorized arrangement
- ❑ **The centrifugal fan is configured to draw air into the cylindrical body, through a filter and centrifugally expel the air in all directions, i.e. 360° about the axis of the body, through outlets .**
- ❑ A **control unit** is configured to control the speed of the fan motor and to open/close the perforations.
- ❑ Air expelled from the outlets is deflected by a **deviator plate** which is conformed in **truncated conical shape to cause uniform distribution of purified air through the space**
- ❑ Further includes a **germicidal irradiation unit**, to irradiate any bio particulates entering the interior of the cylindrical body

Image

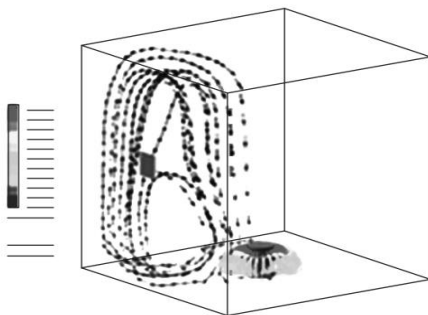


FIG. 2(a) illustrates CFD flow simulation results of an air purifier having **180° deviating plate angle**.

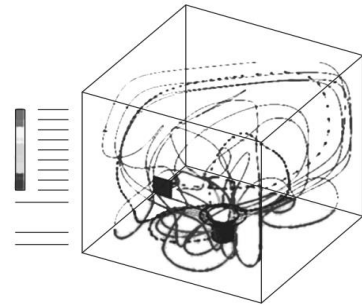


FIG. 2(b) illustrates CFD flow simulation results of an air purifier having **60° deviating plate angle**

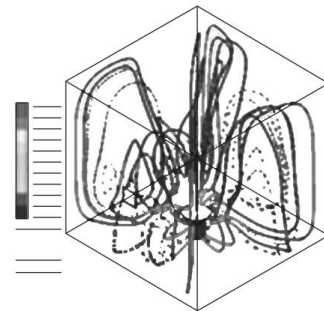


Fig.2(c) illustrates CFD flow simulation results of a smart air purifier having **45° deviating plate angle**

Intellectual Property

- IITM IDF Ref. 1412
- IN427740- Granted

TRL (Technology Readiness Level)

TRL-3 Experimental Proof of concept

Research Lab

Prof. Shiva Nagendra S M
Dept. of Civil Engineering,

CONTACT US

Dr. Dara Ajay, Head
Technology Transfer Office,
IPM Cell- IC&SR, IIT Madras

IITM TTO Website:
<https://ipm.icsr.in/ipm/>

Email: smipm-icsr@icsrpis.iitm.ac.in

sm-marketing@imail.iitm.ac.in

Phone: +91-44-2257 9756/ 9719