12. Title: Air filters for filtration of airborne particles

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Keywords: Air filtration, Fibrous air filter, Fibre shape gradient

Domain: Environment

Summary: A small, compact, light-weight and three-dimensional structure of fibrous air filter is developed for high performance air filtration. It is a multilayered structure in which each layer from upstream to downstream is made up of fibers with different cross-sectional shapes so as to create a gradient of fiber non-circularity along the depth of air filters. This air filter is of bi-layered structure wherein one fibre-layer in the downstream is made up of 50% by weight of fibers with non-circular cross-sections and the other fibre-layer in the upstream is prepared from 50% by weight of fibres with circular cross-section. This structure offers higher filtration efficiency.

Advantages:

- Its multilayered structure wherein each layer from upstream to downstream is made up of fibers with different cross-sectional shapes creates a gradient of fibre non-circularity along the depth of air filters offers high dirt holding capacity.
- This system provides low resistance to air flow
- In this system, frequent replacement of components of the air filter is not required.

Applications:

- HVAC filters, HEPA filters and ULPA filters
- Engine intake air filters
- Cabin air filters
- Compressed air filters, steam air filters
- Respirators and Air purifiers

Scale of Development: A functional prototype air filter is developed and performance is validated in Laboratory environment.

Technology Readiness Level: 5

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