

# IIT Roorkee develops low-cost portable ventilator to tackle COVID-19

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**-The closed-loop ventilator does not require compressed air and is useful when wards are converted to ICUs -**

## INVC NEWS

Roorkee,

IIT Roorkee has developed a low-cost portable ventilator that can be useful to ensure the survival of COVID-19 patients. Named as 'Prana-Vayu,' the closed-loop ventilator is developed in collaboration with AIIMS, Rishikesh, and is equipped with state-of-the-art features. The ventilator is based on the controlled operation of the prime mover to deliver the required amount of air to the patient. The automated process controls the pressure and flow rates in the inhalation and exhalation lines. Besides, the ventilator has feedback that can control tidal volume and breathe per minute. The ventilator will be useful for a wide degree of congestions in the respiratory tract and is applicable for all age group patients, especially the elderly. The prototype has been tested successfully for normal and patient-specific breathing conditions. Additionally, it does not require compressed air for functioning and can be especially useful in cases when hospital wards or open areas are converted into ICUs. It is safe and reliable as it is equipped with real-time spirometry and alarms. It can automatically limit high pressure with an alarm system. In case of a failure, the circuit opens to the atmosphere which prevents choking. Some additional features are remote monitoring by health professionals, touch screen control of all operating parameters, moisture, and temperature control for inhaled air. The manufacturing cost per ventilator is estimated to be INR 25000.

The research team from IIT Roorkee included Prof. Akshay Dvivedi and Prof. Arup Kumar Das with online support from Dr. Debendra Tripathi from AIIMS Rishikesh. They teamed up only a week back by remote communication to develop a quick time technology to help the distressed in the situation of COVID-19. The research development on the ventilator started during the lockdown period necessitating the development of many parts like microprocessor-controlled non-return valves, solenoid valves, one-way valve, etc. using the facilities of Tinkering Laboratory, IIT Roorkee.

“Prana-Vayu has been designed especially for COVID-19 pandemic. It is low-cost, safe, reliable, and can be quickly manufactured. We have successfully achieved the ventilatory requirement on a test lung, and it can be used for both infants and even overweight adults,” said Prof. Akshay Dvivedi, Coordinator, Tinkering Laboratory, IIT Roorkee. “Our commercial product will be of approximate dimensions of 1.5 feet x 1.5 feet for effective portability,” he added.

“Today ‘Prana-Vayu’ was presented to more than 450 industries in a webinar organized by CII. I am happy to share that we have received interest from multiple industries for its mass production. We are committed to augmenting the efforts of the government in tackling the pandemic. This low-cost ventilator will be highly useful for COVID-19 patients, especially when there is a shortage of ventilators.” said Prof. Ajit K Chaturvedi, Director, IIT Roorkee.

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