



## National Institute of Technology Calicut

### Reusable Aerosol Boxes for treating COVID19 Patients

#### **Importance of Aerosol box**

Doctors and supporting staffs worldwide are at great risk while treating COVID19 infected patients. Conventionally, they wear PPE kit while intubating each patient. Healthcare community is employing a new, reusable protective device very recently, namely "Aerosol box". This device helps anesthesiologists and other physicians while intubating patients by protecting them from aerosols and droplets containing virus. In this way, spilling of internal secretions from patients during insertion and discharge of tubings can be reduced. The device typically consists of a transparent box that slips over the patient's head and shoulders having dedicated openings/holes for access/airway management. These boxes are reusable and easy to sanitize.

#### **Work done at NIT Calicut**

With the basic template available from the literature (<https://sites.google.com/view/aerosolbox/design>), and looking into the specific requirements from the doctors at the Department of Anesthesiology, Govt. Medical College Kozhikode, our team has adopted an acrylic box design having dimension of 25x20x20 inches (length x breadth x height, respectively). Transparent acrylic sheets having 4 mm thickness has been used for the fabrication. The access holes have a dimension of 10 inches. The fabrication procedure is simple and economical, with a cost of Rs. 3,500-4,000/- per box.

A short video has been prepared about the fabrication, and it is uploaded in the official YouTube channel of NIT Calicut. The video can be viewed/ downloaded from the URL: <https://www.youtube.com/watch?v=gzd-xPzz3gl>. This video contains complete technical details on developing these boxes.

The first box had been delivered to the Govt. Medical College Kozhikode on 30<sup>th</sup> March 2020, and the doctors have successfully completed its testing. By 2<sup>nd</sup> April 2020, ten more boxes have been delivered to Govt. Medical College Kozhikode, and further discussions for improvements are ongoing. This is currently being used not only at Govt. Medical College Kozhikode, but also at several hospitals in different parts of Kerala. The whole activities are coming under the Unnat Bharat Abhiyan initiative of MHRD, GOI. Selected photos related to this initiative are given below.



*Images of the Aerosol boxes*



*Dr. V.R. Rajendran (Principal, Govt. Medical College Kozhikode), Dr. Vijayan (Professor, Neurosurgery, Govt. Medical College Kozhikode), Dr. Biji KP (Associate Professor, Department of Anesthesia, Govt. Medical College Kozhikode) and Dr. Vineetha (Associate Professor, Department of Anesthesia, Govt. Medical College Kozhikode), received the aerosolboxes from Mr. Muhammed Shafeeque Rahman (Ph.D. scholar, School of Materials Science and Engineering, NIT Calicut) on 2<sup>nd</sup> April 2020.*



*Aerosol boxes in use at Govt. Medical College Kozhikode.*

**Team members:**

Dr. Biji KP (Associate Professor, Department of Anesthesia, Govt. Medical College Kozhikode) suggested the basic design (from the literature) and the specific requirements to NITC team. Members at NITC include Dr. Subramanyan N V (Asst. Prof, Physics and UBA coordinator), Mr. Muhammed Shafeeque Rahman (Ph.D. scholar, School of Materials Science and Engineering), Dr. Hanas. T (Asst Prof, School of Materials Science and Engineering), Dr. Sajith. V (Assoc. Prof, School of Materials Science and Engineering), and Dr. Jimmy Jose (Assoc. Prof, Computer Science and Engineering Department).

NIT Calicut would be happy to share all the details and would like to encourage all concerned to make use of this device for helping the medical professionals across the globe. Please feel free to write to us for any further queries. Contact details are as follows: Dr. Subramanyan N V <[varanakkottu@nitc.ac.in](mailto:varanakkottu@nitc.ac.in)>

Submitted by  
Sivaji Chakravorti  
Director, NIT Calicut

Date: April 14, 2020