



OxVent

Affordable mechanical ventilation
for low-resource settings



Specifications

Ventilation Modes	Volume Controlled Ventilation (VCV), Assist Control Ventilation (ACV)
Ventilator type	Pressure-driven ambulatory bag
Life time	>500 hours before resuscitator bag replacement
Suitable for Invasive-Ventilation	Yes
Suitable for Non-Invasive-Ventilation	No
Tidal Volume (VT)	250 to 600 ml
Respiratory Rate (RR)	10 to 30 breaths per minute
Peak Inspired Pressure	15 to 45 cmH ₂ O
Fraction of Inspired Oxygen (FIO₂)	21 to 100%
Inspiratory/expiratory ratio	2:1 to 1:3
Positive End-Expiratory Pressure (PEEP)	5 to 20 cmH ₂ O
Trigger pressure below PEEP, ACV	1 to 10 cmH ₂ O
Alarms	FIO ₂ low, PEEP high/low, PIP high/low, VT high/low, RR high/low, Apnea (ACV), Inspiratory/Expiratory Volume low/high, Power Supply Disconnected, Flow Leak
Power Supply	110-240V, 50-60Hz. 1 hour battery back-up UPS
Drive Gas	4 Bar wall compressed air supply
Environmental Conditions	5 to 35°C, 30% to 70% relative humidity
Internal Un-interruptable Power Supply	> 1 hour
Weight and Dimensions	7 kg (9kg inc. packaging & kit) and 480x290x240 mm

Training and Support

- Full training is available
- Each unit is supplied with a comprehensive user manual and training demonstration videos



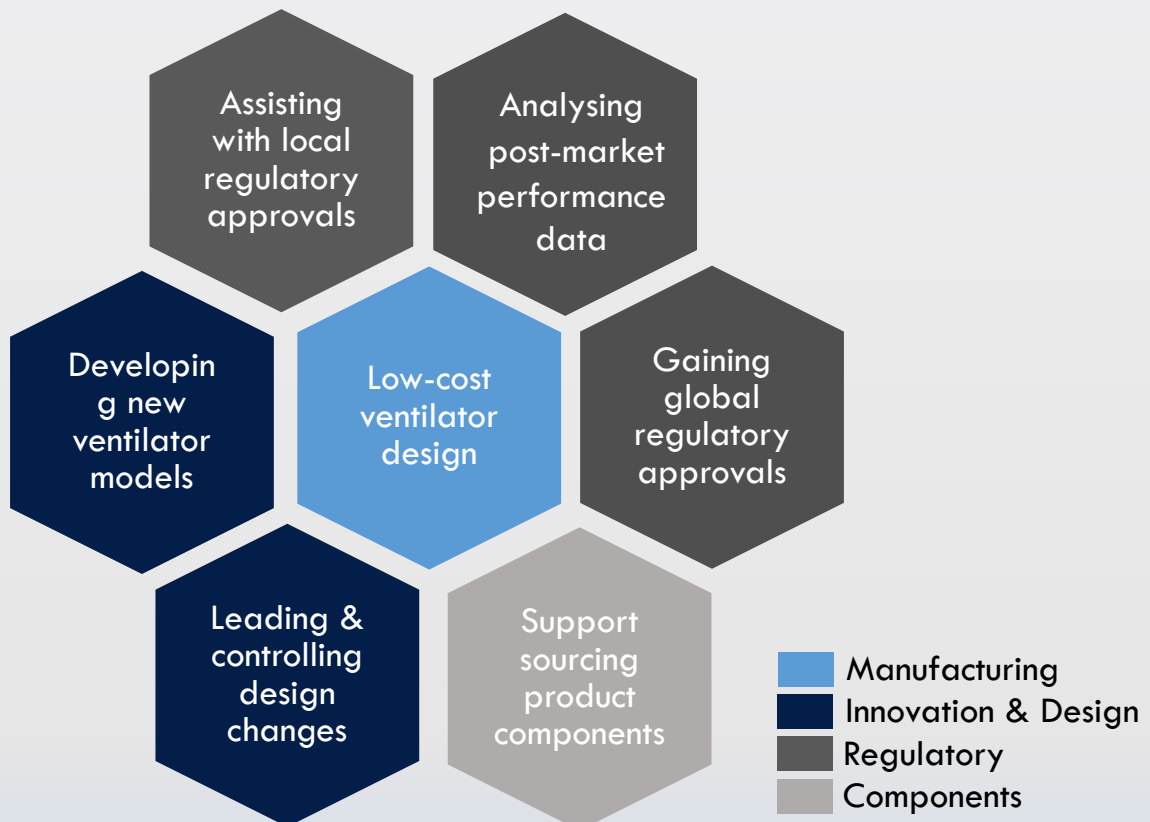
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OxVent's Innovative Wrap-around Support System for Distributors and Manufacturers

OxVent can supply ventilators for distribution or can work with manufacturers to establish local production. We will actively support all aspects of bringing the ventilator to market, including: product supply, training, regulatory assistance, post-market performance analysis, component sourcing and manufacturing set-up and documentation.





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"OxVent is a simple volume-controlled ventilator with controls and limits that make it safe to use in COVID-related ARDS. The extensive laboratory and *in vivo* testing gave me confidence to use the ventilator clinically in the UK, if it had become necessary to do so. It is a very useful tool to provide invasive ventilation cheaply and quickly." **Dr Andrew Farmery, Professor of Anaesthetics, University of Oxford**



The University of Oxford (@UniofOxford) was recognised at the Institution of Engineering and Technology's (@TheIET) virtual E&T Innovation Awards ceremony yesterday.

As part of the UK Government Ventilator Challenge and in response to the coronavirus pandemic, a rapid design and manufacture low cost ventilator was created by the University of Oxford. The OxVent was designed, tested and manufactured by a group of doctoral students, professors, clinicians and industry partners at the university, Kings College London and Smith & Nephew

"This year's entries show that even under challenging circumstances, innovation remains in good health across a wide range of traditional and non-traditional areas to address society's challenging needs."

Alan Newby – Director Aerospace Technology and Future Programmes, Rolls-Royce Plc

THE ENGINEER Collaborate to Innovate

HIGHLY COMMENDED

PROJECT:
OxVent

PARTNERS:
Oxvent Ltd with University of Oxford, King's College London and Smith+Nephew

Within a week of the UK Ventilator Challenge being announced, an early incarnation of the OxVent team was demonstrating a low-cost prototype to the Cabinet Office. Though it ultimately transpired that the clinical demand for ventilators was lower than initially feared, the collaboration has produced a brand new medical device, ready to be deployed in emergency situations.

According to OxVent, most of the ventilator's 100 or so components are available off-the-shelf and it features just a single moving part. Based on the pneumatic "bag-in-a-bottle" principle, the device has a proportional solenoid valve which controls injection of air at 4 bar into a sealed box compressing a standard bag valve mask inside, displacing an equal volume of air which is used to ventilate the patient.

Lung injury due to overpressure is prevented by both hardware and software controls, and additional protection is provided by a full set of alarms. There are two modes of operation: mandatory ventilation and assist control ventilation, whereby attempts by the patient to breathe spontaneously are detected and trigger the delivery of a breath at a pre-set volume. As a volume control ventilator, OxVent also has much lower oxygen requirements than standard pressure control ventilators and high-flow oxygen therapy, reducing demand on the oxygen supply of hospitals.



A single manufacturing line at Smith+Nephew's Hull site was set up with production capability of 5,000 units per week at cost price of around £1,000 per unit. Demand in the UK meant that this facility was never called into action, but OxVent is exploring opportunities to supply its device to low and middle income countries (LMICs), where demand for mechanical ventilation is expected to grow regardless of Covid, and where a shortage of the right equipment can be a matter of life and death.