

Ventilator specifications for COVID

SN	Parameter	Essential / HLL	Desirable/ Ministry
1	The ventilator should be microprocessor based with active exhalation valve.	Yes	
2	The ventilator should be turbine based/ run on compressor. The compressor (if available) should be stand alone and from the same manufacturer with price quoted separately	Yes	
3	Suitable for use in ICU for Adult, Pediatric patients	Yes	
4	Should undergo automatic calibration system on start-up.	Yes	
5	It should have in-built programmable ultrasonic nebulizer/ external nebuliser		Yes
6	Screen Size	6.5 inch or more in size.	10 inch or more
7	Modes available:	PC-CMV, PC-SIMV, PSV, VC-SIMV, VC-CMV, PRVC, ACV, CPAP, BPAP	APRV, Bi-phasic ventilation, Auto-weaning modes
8	Ventilator settings		
8.1	Peak Pressure	60 cmH ₂ O	
8.2	Peak Respiratory rate	60 Breath per minute	
8.3	Inspiratory time	At least 0.3 -2.5	0.3-5 sec

		seconds	
8.4	Tidal Volume	50 ml to 2000 ml	
8.5	Peak Flow rate	240 Litres per minute	
8.6	PEEP	0 cm H ₂ O to 30 cm H ₂ O (increments of 1 cm H ₂ O)	
8.7	Pressure Support	0-40 cm H ₂ O	
8.8	Inspiratory pause	Available	expiratory pause sustained exhalation
8.9	I:E ratio	1:4 to 4:1	
8.10	Trigger Flow Sensitivity	1 Litre per minute to 10 Litre per minute	0.1 litre-20 litre/ min
8.11	Programmable/ adjustable SIGH		Yes
8.12	Leak Volume Compensation		Yes
8.13	Trigger Compensation		Yes
8.14	Volume Accuracy	2-3 % of the full scale between (10 L/min - 80L/min)	
9	Monitored Parameters		
9.1	Respiratory Phase and Type	Yes	
9.2	Exhaled Tidal and Minute volume	Yes	
9.3	Respiratory Rate	Yes	
9.4	Total leak percentage/ Leak volume	Yes	
9.5	Spontaneous Minute Volume	Yes	

9.6	I : E Ratio	Yes	
9.7	Peak Inspiratory and End Expiratory Pressure	Yes	
9.8	Mean and Plateau Pressure	Yes	
9.9	Auto/ Intrinsic PEEP	Yes	
9.10	RSBI		Yes
9.11	Static Compliance and Resistance		Yes
9.12	Low Inflection point (LIP) and upper inflection point (UIP)		Yes
9.13	Maximum Inspiratory Pressure		Yes
9.14	Lung recruitment maneuver & Monitoring.		Yes
10	Should have graphics mode with display of followings scalers: <ul style="list-style-type: none"> • Flow vs Time • Pressure vs time • Volume vs Time 	Yes	
11.	Should have display of loops : <ul style="list-style-type: none"> • Flow/ Volume • Pressure/ Volume • Pressure/ Flow 	-	Yes
12	Alarms		

12.1	Power Disconnected	Power Supply unplugged	
12.2	Patient Disconnected	PIP < (Desired Pressure x 0.6)	
12.3	High Inspiratory Pressure	PIP < (Desired Pressure x 0.6)	
12.4	High PEEP	PEEP > Set PEEP + 2 or 6 Consecutive cycles	
12.5	High Respiratory Rate	RR > 70	
12.6	Power Sensor Failure	Power sensor fails to respond	
12.7	Read/Write Error	Settings saved in memory could not be read	
12.8	Ventilator Temperature Error	The core temperature of ventilator CPU greater than 85 °C	
12.9	System Failure (Safe Mode)	Vital components inactive	
12.10	Low Tidal Volume	VTi < Set VT * 0.75 for 6 consecutive cycles	
13	Alarm History of ≥ 100 alarms.	Yes	
14	Should have battery backup of at least 2 hrs for ventilator	Yes	
15	Displayed Trends Values for 48 hours atleast for above parameters.	Yes	
16	Should be approved by reputed national/ international agency	Yes	

17	Company should have local service centre and should provide service 24x7.	Yes	
18	Certified for meeting IEC 60601-1-4 Medical electrical equipment - Part 1-4: General requirements for safety - Collateral Standard: Programmable electrical medical systems	Yes (within 30 days of placing order)	
19	The service provider should have the necessary equipments recommended by the manufacturer to carry out preventive maintenance test as per guidelines provided in the service/maintenance manual.	Yes	
20	All equipment should be from the same manufacturer or OEM (original equipment manufacturer)	Yes	
21	Must submit user list and performance report within last 5 years from major Central Govt./State Govt./reputed private		Yes

	hospitals		
22	Packing List	<p>1 Advanced Covid Ventilator</p> <p>Arm Holder and Humidifier (if not part of equipment, compatible humidifier and arm holder should be available as additional accessories)</p> <p>1 User Manual</p> <p>1 Warranty card</p> <p>220-volt power cable</p> <p>12 Volt power cable</p> <p>Stand Attachment</p>	<p>Patient tubings: Adult, Paeds: 2/ unit</p> <p>NIV mask" 2 for adult and pediatric/ unit</p> <p>Test lung: 1</p> <p>Flow rensor (reusable): 2</p>

PPE KITS specifications for COVID

1. PPE Kit

1.1 Gloves (Double pair)

- Nitrile
- Non-sterile
- Powder free
- Outer gloves preferably reach mid-forearm (minimum 280mm total length)
- Different sizes (6.5 & 7)
- Quality compliant with the below standards, or equivalent:
 - a. EU standard directive 93/42/EEC Class I, EN 455
 - b. EU standard directive 89/686/EEC Category III, EN 374
 - c. ANSI/SEA 105-2011
 - d. ASTM D6319-10

1.2 Coverall (medium and large)

- Impermeable to blood and body fluids
- Single use
- Avoid culturally unacceptable colors e.g. black
- Light colors are preferable to better detect possible contamination
- Thumb/finger loops to anchor sleeves in place
- Quality compliant with following standard
 - a. Meets or exceeds ISO 16603 class 3 exposure pressure, or equivalent

1.3 Goggles

- With transparent glasses, zero power, well fitting, covered from all sides with elastic band/or adjustable holder.
- Good seal with the skin of the face
- Flexible frame to easily fit all face contours without too much pressure
- Covers the eyes and the surrounding areas and accommodates for prescription glasses
- Fog and scratch resistant
- Adjustable band to secure firmly so as not to become loose during clinical activity
- Indirect venting to reduce fogging
- May be re-usable (provided appropriate arrangements for decontamination are in place) or disposable
- Quality compliant with the below standards, or equivalent:
 - a. EU standard directive 86/686/EEC, EN 166/2002
 - b. ANSI/SEA Z87.1-2010

1.4. N-95 Masks

- Shape that will not collapse easily
- High filtration efficiency
- Good breathability, with expiratory valve
- Quality complaint with standards for surgical N95 respirator:
 - a. NIOSH N95, EN 149 FFP2, or equivalent
- Fluid resistance: minimum 80 mmHg pressure based on ASTM F1862, ISO 22609, or equivalent
- Quality compliant with standards for particulate respirator that can be worn with full-face shield

2. Face Shield

- Made of clear plastic and provides good visibility to both the wearer and the patient
- Adjustable band to attach firmly around the head and fit snugly against the forehead
- Fog resistant (preferable)
- Completely covers the sides and length of the face
- May be re-usable (made of material which can be cleaned and disinfected) or disposable
- Quality compliant with the below standards, or equivalent:
 - a. EU standard directive 86/686/EEC, EN 166/2002
 - b. ANSI/SEA Z87.1-2010

3. Triple Layer Surgical Mask

- Three layered surgical mask of non-woven material with nose piece, having filter efficiency of 99% for 3 micron particle size.
 - a. ISI specifications or equivalent

4. Gloves

- Nitrile
- Non-sterile
- Powder free
- Outer gloves preferably reach mid-forearm (minimum 280mm total length)
- Different sizes (6.5 & 7)
- Quality compliant with the below standards, or equivalent:
 - a. EU standard directive 93/42/EEC Class I, EN 455
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 - c. ANSI/SEA 105-2011
 - d. ASTM D6319-10

All items to be supplied need to be accompanied with certificate of analysis from national/international organizations/labs indicating conformity to standards

All items: Expiry 5 years

Body Bags – Specifications

- 1) Impermeable
- 2) Leak proof
- 3) Air sealed
- 4) Double sealed
- 5) Disposable
- 6) Opaque
- 7) White
- 8) U shape with Zip
- 9) 4/6 grips
- 10) Size: 2.2 x 1.2 Mts
- 11) Standards:
 - a. ISO 16602:2007
 - b. ISO 16603:2004
 - c. ISO16604:2004
 - d. ISO/DIS 22611:2003


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