

Audience: ICU Leadership, Intensivists, Respiratory Therapists

Purpose: To provide hospitals with background information on ventilators that may be distributed from the Strategic National Stockpile (SNS).

Background: As part of the SNS, the Assistant Secretary for Preparedness and Response (ASPR) maintains a cache of ventilators to be distributed and used during a crisis as we are experiencing with the COVID-19 pandemic. Working together the NYC Department of Health and Mental Hygiene (DOHMH) and NYC Emergency Management (NYCEM) have requested ventilators from this stockpile based on current model projections for COVID-19 infections and critical care patients in NYC. Distribution of these ventilators will be managed through the collaboration of DOHMH, NYCEM, Health and Hospitals and the Greater New York Hospital Association (GNYHA). Through this distribution process, your facility may expect to receive one or more of the three distinct models of portable ventilators in the SNS. Please share this information with your staff so they may become familiar with their use. Additionally, clinical leadership should review manufacturer recommendations to determine which patients are appropriate for ventilation using these resources. SNS ventilator models include:

1. Uni-vent Eagle - Impact Instrumentation - 754 (**Impact 754**),
2. Vyaire - CareFusion - LTV1200 (**LTV1200**),
3. Medtronic/Puritan-Bennett LP10 (**LP10**).

Features, tips, and more information about each ventilator by manufacturer:

Embedded links are listed at end of document.

Impact 754 ([Operations Manual](#); [Quick Start](#), [Manufacturer Training Video](#))

- Low or high pressure oxygen
- Internal PEEP control (*See p. 1-3 manual*)
- Peak flow max 60L/min
- Accuracy at TV < 300 poor unless compressed air used
 - Pressure can vary when using compressed air
- Inlet and outlet to compressor are same size!
- If airway pressure falls < 10 cm, vent will turn off – can be activated by suctioning!
 - Less likely to shut off from suctioning on SIMV
 - Turn off and on if shuts off spontaneously
 - Anti-asphyxia leaf valve can create leak if blocked. (*See p. ix manual*)
- Internal lead-acid type battery rated for up to 3 hours of operation.
 - Battery life of stored ventilators may be lower than specs (<https://www.ncbi.nlm.nih.gov/pubmed/30387852>)

LTV1210 ([Quick Reference Guide](#), [Operator's Manual](#), [Manufacturer Training Video](#))

- Bias flow of 10 L/min
- VC/PC/PSV
- PEEP compensated
- Best for Peds
- Circuits for LTV only work on LTV; other circuits can be shared with some manipulation

LP10 ([Clinician's Manual](#) – troubleshooting guide p.8, [Manufacturer Training Video](#))

- Internal lead-acid type battery rated for up to 1 hour of operation; performance may deteriorate when battery is drained (<https://www.ncbi.nlm.nih.gov/pubmed/30387852>)
- No gas blender – only low inflow oxygen inlet
- External PEEP valve (no PEEP control) – (*see p. 51 of manual*)
 - Ventilator sensitivity must be set ABOVE PEEP
- No SIMV support (spontaneous breaths will be at room air unless additional oxygen supplied)
 - Oxygen flow added to circuit will support spontaneous breaths but will also augment tidal volume (*See p. 48 of manual*)
- Pressure limiting can be done via mechanical device – only works with uncuffed tube (*see p. 23 of manual*)
- Can be attached to a car battery if no other battery sources available (*see p. 27 of manual*)

Physical and Functional Properties of Each Ventilator Type by Manufacturer

Properties	Impact 754	LTV 1200	LP10
Weight (lbs)	13	14.5	34
Dimensions (W x H x D)	8.87" x 11.5" x 4.5"	10.5" x 3.25" x 13.5"	9.75" x 14.5" x 13.25"
Breath types	Volume	Volume and pressure	Volume and pressure
<i>Modes</i>			
Assist control	Y	Y	Y
Synchronized intermittent mandatory ventilation	Y	Y	Y
Continuous positive airway pressure	Y	Y	Y
Pressure support	N	Y	Y
Tidal volume range controls (mL)	0-3,000	50-2,000	100-2,200
Inspiratory flow range (L/min)	0-60	10-100	20-100
PEEP range (cmH2O)	0-20	0-20	0-20 External PEEP
Breath rate (breaths/min)	1-150	0-80	1-38 up to 58
I:E ratio (regulators)	1:1 to 1:599	99:1 to 1:99	
Internal air source	Compressor	Turbine	Piston
Blender (percent oxygen)	Mechanical 21-100	Electronic 21-100	n/a
Internal battery operating time	3 h compressor, 12 h ext gas	1 h	1 h
Internal battery type	Sealed lead-acid	Sealed lead-acid	Sealed lead-acid
External battery operating time	n/a	5 h (using two lithium batteries)	n/a
External battery type	n/a	Lithium ion, sealed lead acid	n/a
Temperature ranges operating	-25 to 49 °C	5 to 40 °C	5 to 40 °C
Charging long-term storage	-20 to 50 °C 10 to 30 °C	n/a -20 to 60 °C	n/a -20 to 50 °C

Source: Mehrabi A et al., "Experimental studies on performance of ventilators stored in the Strategic National Stockpile." J Emerg Manag. 2018 Sep/Oct;16(5):321-336. doi: 10.5055/jem.2018.0381. Available: <https://www.ncbi.nlm.nih.gov/pubmed/30387852>

Embedded Links:

Impact 754:

- Operations Manual: <https://www.aarc.org/wp-content/uploads/2014/11/02-754OM.pdf>
- Quick Start: <https://www.aarc.org/wp-content/uploads/2014/11/02-754EagleTraining.pdf>
- Manufacturer Video: <https://global.gotowebinar.com/join/notStarted.tmp?jsessionid=E252E874F52D960B510AF3F7D8EDE406?webinar=3077202498838237195>

LTV1200:

- Quick Reference Guide: <https://www.aarc.org/wp-content/uploads/2014/11/19822-001-B-LTV-1200-1150-Quick-Reference-Guide.pdf>
- Operator's Manual: <https://www.aarc.org/wp-content/uploads/2014/11/19802-001-F-LTV-1200-and-1150-Ops-Manual.pdf>
- Manufacturer Video: <https://youtu.be/ZdbcXJNSzU>

LP10:

- Clinician's Manual: https://www.aarc.org/wp-content/uploads/2014/11/lp10_clinicians_manual.pdf
- Manufacturer Training Video: <https://youtu.be/xv8vqdf0PYA>

Additional Resource:

Branson, R. "Mass Casualty Ventilation and the Strategic National Stockpile" American Association for Respiratory Care, 2016. <https://youtu.be/pliTMir9wvw>