

Anesthesia Apparatus Checkout Recommendations, 1993

This checkout, or a reasonable equivalent, should be conducted before administration of anesthesia. These recommendations are only valid for an anesthesia system that conforms to current and relevant standards and includes an ascending bellows ventilator and at least the following monitors: capnograph, pulse oximeter, oxygen analyzer, respiratory volume monitor (spirometer) and breathing system pressure monitor with high and low pressure alarms. This is a guideline which users are encouraged to modify to accommodate differences in equipment design and variations in local clinical practice. Such local modifications should have appropriate peer review. Users should refer to the operator's manual for the manufacturer's specific procedures and precautions, especially the manufacturer's low pressure leak test (step #5).

Emergency Ventilation Equipment

* 1. Verify Backup Ventilation Equipment is Available & Functioning

High Pressure System

* 2. Check Oxygen Cylinder Supply

- Open O_2 cylinder and verify at least half full (about 1000 psi).
- Close cylinder.

* 3. Check Central Pipeline Supplies

- Check that hoses are connected and pipeline gauges read about 50 psi.

Low Pressure System

* 4. Check Initial Status of Low Pressure System

- Close flow control valves and turn vaporizers off.
- Check fill level and tighten vaporizers' filler caps.

* 5. Perform Leak Check of Machine Low Pressure System

- Verify that the machine master switch and flow control valves are OFF.
- Attach "Suction Bulb" to common Fresh gas outlet.
- Squeeze bulb repeatedly until fully collapsed.
- Verify bulb stays *fully* collapsed for at least 10 seconds.
- Open one vaporizer at a time and repeat 'c' and 'd' as above.
- Remove suction bulb, and reconnect fresh gas hose.

* 6. Turn On Machine Master Switch

and all other necessary electrical equipment.

* 7. Test Flowmeters

- Adjust flow of all gases through their full range, checking for smooth operation of floats and undamaged flowtubes.
- Attempt to create a hypoxic O_2/N_2O mixture and verify correct changes in flow and/or alarm.

Scavenging System

* 8. Adjust and Check Scavenging System

- Ensure proper connections between the scavenging system and both APL (pop-off) valve and ventilator relief valve.
- Adjust waste gas vacuum (if possible).
- Fully open APL valve and occlude Y-piece.
- With minimum O_2 flow, allow scavenger reservoir bag to collapse completely and verify that absorber pressure gauge reads about zero.
- With the O_2 flush activated allow the scavenger reservoir bag to distend fully, and then verify that absorber pressure gauge reads < 10 cm H $_2O$.

Breathing System

* 9. Calibrate O_2 Monitor

- Ensure monitor reads 21% in room air.
- Verify low O_2 alarm is enabled and functioning.
- Reinstall sensor in circuit and flush breathing system with O_2 .
- Verify that monitor now reads greater than 90%.

10. Check Initial Status of Breathing System

- Set selector switch to "Bag" mode.
- Check that breathing circuit is complete, undamaged and unobstructed.
- Verify that C_{O_2} absorbent is adequate.
- Install breathing circuit accessory equipment (e.g. humidifier, PEEP valve) to be used during the case.

11. Perform Leak Check of the Breathing System

- Set all gas flows to zero (or minimum).
- Close APL (pop-off) valve and occlude Y-piece.
- Pressurize breathing system to about 30 cm H $_2O$ with O_2 flush.
- Ensure that pressure remains fixed for at least 10 seconds.
- Open APL (Pop-off) valve and ensure that pressure decreases.

Manual and Automatic Ventilation Systems

12. Test Ventilation Systems and Unidirectional Valves

- Place a second breathing bag on Y-piece.
- Set appropriate ventilator parameters for next patient.
- Switch to automatic ventilation (Ventilator) mode.
- Fill bellows and breathing bag with O_2 flush and then turn ventilator ON.
- Set O_2 flow to minimum, other gas flows to zero.
- Verify that during inspiration bellows delivers appropriate tidal volume and that during expiration bellows fills completely.
- Set fresh gas flow to about 5 L/min.
- Verify that the ventilator bellows and simulated lungs fill and empty appropriately without sustained pressure at end expiration.
- Check for proper action of unidirectional valves.
- Exercise breathing circuit accessories to ensure proper function.
- Turn ventilator OFF and switch to manual ventilation (Bag/APL) mode.
- Ventilate manually and assure inflation and deflation of artificial lungs and appropriate feel of system resistance and compliance.
- Remove second breathing bag from Y-piece.

Monitors

13. Check, Calibrate and/or Set Alarm Limits of all Monitors

Capnometer Pulse Oximeter
Oxygen Analyzer Respiratory Volume Monitor (Spirometer)
Pressure Monitor with High and Low Airway Alarms

Final Position

14. Check Final Status of Machine

- Vaporizers off
- AFL valve open
- Selector switch to "Bag"
- All flowmeters to zero
- Patient suction level adequate
- Breathing system ready to use

* If an anesthesia provider uses the same machine in successive cases, these steps need not be repeated or may be abbreviated after the initial checkout.