

Dynasthetics



Vapor-Clean

Vapor-Clean Filters for MH-Susceptible



Normal Circuit



Coaxial Circuit

For MH-Susceptible Patients

Ready in Under 90 Seconds

The internal components of modern anesthesia machines capture and hold volatile anesthetics which are released when the machine is used for a new patient. Even trace amounts of vapor can be harmful for susceptible patients. Previously, flushing the anesthesia machine with high fresh gas flow for an extended time before a case was thought to help decrease the risk to susceptible patients. Now, in less than 90 seconds, Vapor-Clean activated charcoal filters reduce exposure to less than 5ppm of desflurane, sevoflurane and isoflurane molecules from reaching the patient for an entire case lasting up to 12 hours.

Standardize Anesthesia Machine Preparation for MH

- Compatible with all anesthesia machines
- Two-year minimum shelf life
- Reduces costly operating room delays due to "surprise" MH-susceptible patients
- Negligible additional breathing circuit resistance
- No need to remove CO₂ absorbant
- Compatible with both standard two-limb and coaxial breathing circuits

For an MH Crisis: Curtail Exposure to Volatile Agents Without Delaying Dantrolene

In the event of an MH crisis, physicians can quickly turn off the anesthetic gas, place the Vapor-Clean and curtail further exposure without delaying the administration of dantrolene, and without switching to manual ventilation. Without the Vapor-Clean, the time needed to replace the anesthesia machine, or change the circle system and CO₂ absorbant can often delay the administration of dantrolene.

Product Code	Description	QTY
101AU	Vapor-Clean Filters	BOX 8
111AU	Vapor-Clean Filters	BOX 3



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Dynasthetics

Vapor-Clean

Traditional Flushing Takes Longer Than You Think

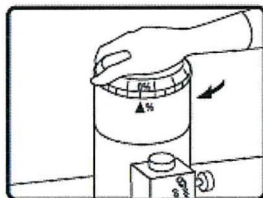
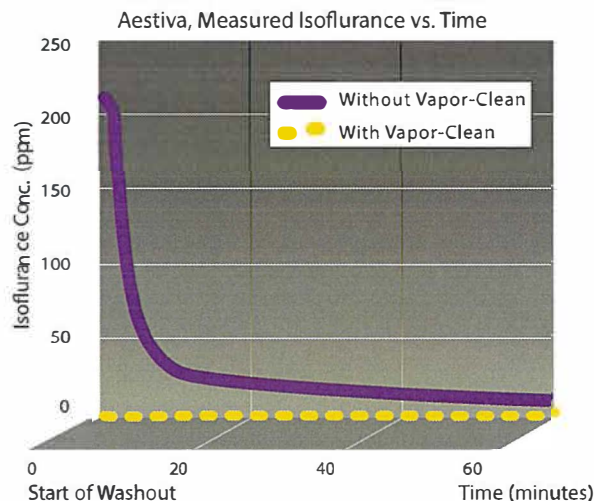
The table is a summary of published studies that show the extended periods of flushing needed without the Vapor-Clean filters before modern anesthesia delivery systems can be used for MH-susceptible patients.

The data plot at right shows concentration of anesthetic vapor in an Ohmeda Aestiva anesthesia machine after the machine was used to deliver isoflurane at 1 MAC for 2 hours. Without the Vapor-Clean, it took over 60 minutes of flushing the machine at 10 L/min before the vapor emitted by the machine was safely below 5 parts per million. Under the same conditions, when using the Vapor-Clean filters, the machine was ready in less than 2 minutes.

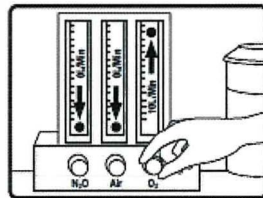
No Rebound Effect with the Vapor-Clean

Patients are not exposed to a rebound effect as the Vapor-Clean filters block vapors for the entire case².

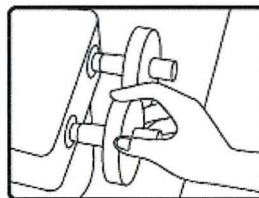
Workstation type	Anesthetic agent	Published washout time (time to inspired agent less than 5 parts per million)	Time to inspired agent less than 5 parts per million with Vapor-Clean filters
Ohmeda Aestiva	Isoflurane	54 minutes ²	Less than 1 minute ²
Ohmeda Aestiva	Sevoflurane	48 minutes ²	Less than 1 minute ²
Ohmeda Aestiva	Desflurane	27 minutes ²	Less than 1 minute ²
Draeger Apollo	Isoflurane	84 minutes ²	Less than 1.5 minutes ²
Draeger Apollo	Sevoflurane	46 minutes ²	Less than 1 minute ²
Draeger Apollo	Desflurane	53 minutes ²	Less than 1 minute ²
Draeger Primus	Isoflurane	64 minutes ⁴	
Ohmeda Aestiva	Sevoflurane	55 minutes ⁵	Less than 1 minute ²
Draeger Fabius	Sevoflurane	104 minutes ³	
GE Avance	Sevoflurane	61 minutes ⁴	
Maquet Flow-i	Sevoflurane	48 minutes ⁴	
GE Aisys	Sevoflurane	55 minutes ⁴	



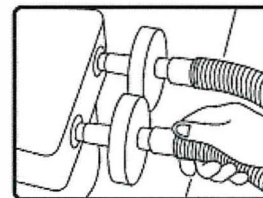
1. Turn off the anesthesia vaporizer



2. Increase fresh gas flow to >10 L/min for at least 90 seconds to flush the vapor from the anesthesia delivery system



3. Place one of the Vapor-Clean canisters on the inspired port of the anesthesia machine and the other canister on the expired port of the anesthesia machine.



4. Replace the breathing bag and connect a new breathing circuit between the patient and the VaporClean canisters. Maintain fresh gas flow at >3L/min.



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Vapor-Clean Filters Frequently Asked Questions and Answers

Q: What is Vapor-Clean?

A: Vapor-Clean is a set of activated charcoal filters placed on the anesthesia machine that block trace amounts of volatile anesthetics from reaching malignant hyperthermia susceptible patients.

Q: How is Vapor-clean used?

A: Each filter is connected to the breathing circuit and the anesthesia machine inspiratory and expiratory ports. The anesthesia machine is ready to deliver a completely vapor free (less than 5 parts per million) anesthetic in less than 90 seconds.

Q: Without the Vapor-Clean, how long do modern anesthesia machines need to be flushed at high fresh gas flow before they are safe to use with an MH-susceptible patient?

A: That depends on the machine. Recent studies show that each machine must be flushed for as long as 104 minutes before it can be used safely with an MH-susceptible patient. Even after extended flushing, the concentration of vapor can rise to unsafe levels if the fresh gas flow is inadvertently lowered to normal levels.

Q: How quickly can an anesthesia machine be ready for use with a susceptible patient using Vapor-Clean?

A: Studies have shown that the machine is ready within 90 seconds after installing the Vapor-Clean.

Q: What are the advantages of using Vapor-Clean over flushing?

A: There are several: No waiting for a machine to be ready saving costly OR time. Unlike flushing, since the filters are left in place during the case, the patient is protected for the entire case lasting up to 12 hours. And, an OR schedule doesn't have to be thrown off by an unanticipated MH-susceptible patient.

Q: Have there been published studies showing that Vapor-Clean removes residual volatile anesthetics?

A: Birgenheier et. al. in the June 2011 Anesthesia and Analgesia showed that Vapor-Clean effectively removes anesthetic to less than 5 parts per million in less than 90 seconds when tested with isoflurane, sevoflurane and desflurane in Drager Apollo and an Ohmeda Aestiva anesthesia machines. This study also showed that these machines require flushing at 10 liters per minute for as up to 84 minutes before they are ready *without* Vapor-Clean.

Q: Is Vapor-Clean compatible with all anesthesia machines?

A: Yes.

Q: Do I need to remove the vaporizers and soda lime before delivering anesthesia to an MH-susceptible patient?

A: No. The Vapor-Clean captures trace vapor released by all components of the anesthesia machine including the vaporizer and the soda lime.

Q: Do I need a new breathing circuit and bag when using the Vapor-Clean?

A: Yes.

Q: Does the Vapor-Clean work with coaxial breathing circuits?

A: Yes. The Vapor-Clean filters are placed between the anesthesia machine and the coaxial circuit manifold.

Q: How does the Vapor-Clean remove anesthetic vapors?

A: The Vapor-Clean filter canisters contain granules of medical grade activated charcoal which captures volatile anesthetic vapor molecules.

Q: Can the Vapor-Clean be reused?

A: No. The Vapor-Clean is a single patient use device.

Q: Can the Vapor-Clean be used if Malignant Hyperthermia is detected intra-operatively?

A: Yes. When installed intra-operatively the Vapor-Clean removes residual anesthetic vapors emitted by the anesthesia gas machine as well as vapors exhaled by the patient.

Q: What is the source of residual anesthetic vapor in the anesthesia gas machine?

A: Plastic and rubber components within the anesthesia machine (valves, tubing, bellows, etc.) absorb anesthetic vapor. These absorbed gases are then slowly released when the machine is used for a new patient during a subsequent anesthetic procedure.

Q: Where is the Vapor-Clean being used?

A: Vapor-Clean is currently in use at many of the leading pediatric and adult hospitals in the United States and Canada.