

# Vetamac Vapors

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## WAG Part I

This issue of Vapors will begin a discussion about waste anesthetic gas (WAG) evacuation. There can be confusion regarding what this means and how it is accomplished. The effects of exposure to WAG and acceptable limits of exposure will be discussed in a future issue.

The pop-off valve on the anesthetic machine is the point at which WAG is captured for evacuation. A closed evacuation device is connected to the pop-off valve to conduct the WAG out of the work environment. All machines currently manufactured have a pop-off valve that will facilitate this connection. Some older machines do not have a valve to capture the WAG but can be retrofitted with an appropriate valve.

The exit port from the pop-off valve is a standard 19mm fitting. Some older pop-off valves have a 22mm fitting so there is not yet uniformity in the size of the connection. The reason that the standard is now 19mm and not 22mm is to prevent the breathing circuit tubes, which are 22mm, from being connected to the pop-off valve. And yes, this has happened.

There are two types of evacuation systems defined as passive and active. Regardless of which system is used, one point must be emphasized: the movement of gas out of the pop-off into the system must be passive. There should be no negative pressure applied to the breathing system. This prevents unwanted removal of gas from the anesthetic system.

There are two methods of evacuation when a passive system is utilized. One utilizes activated charcoal to adsorb the anesthetic gas and the other moves the gas to the outside of the building. When activated charcoal canisters are used, the system must be monitored. This can be done by weighing the canister when it is new and then periodically weighing it until the recommended weight gain is achieved (usually 50 grams). There are charcoal canisters that have an electronic monitor that sounds an alarm when it detects the first escape of gas through the canister. The activated charcoal canisters are effective but there may be occasional escape of WAG through the canister especially at oxygen flow rates higher than 1 liter/minute. Emphasis must be placed on monitoring these canisters.

Another passive method of WAG evacuation is accomplished by connecting the pop-off valve to a closed system that allows the gas to move to the outside. This system is effective but the gas conduction system of tubing and pipe must not be too long. The system should not exceed a distance of 25 feet. This is because excessive distances will increase the resistance to the movement of the gas and may actually cause back pressure on the system. If the system goes through a wall to the outside, it is easy to limit the distance. However, if the gas goes up to the ceiling and is then conducted outside, this distance may be exceeded. The point of exit of the system from the building should be pointing down and should be protected to prevent insects and debris from entering the system.

If there are multiple stations to which a machine(s) can be connected there must be at each station either: 1) a plug for the station when it is not being used, or 2) a check valve placed in the line at each station. This prevents the flow of gas backwards through the system into the work environment.

Passive WAG evacuation is effective but active evacuation is preferred especially when there are more than two stations to which the anesthesia machine is attached. The next issue of Vapors will discuss active evacuation systems.

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**We would be interested in sharing how you  
use Vapors in your clinics. Submit your  
ideas to [info@vetamac.com](mailto:info@vetamac.com) and we will  
publish the answers.**