

# Breathing Circuit Filters by Recommended Application – For use with Anesthesia Machine Breathing Circuits

Specific Guidance on the use of Filters can be found [HERE](http://www.apsf.org) (www.apsf.org)

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Manufacturer	Part #	Description	Viral Filtration Efficiency	Tidal volume range or Min tidal volume (mls)	Internal Volume (mls)	Comments	
<b>Airway Heat &amp; Moisture Exchange Filters (HMEF)</b>		For use at the patient's airway - between the airway and the breathing circuit.					This list favors mechanical HMEs with gas sampling ports. Tidal volume targets indicate patient selection. Devices that are Electrostatic HMEFs or uncertain design are not favored since their VFE and filtration performance is not as good as mechanical filters. Ideally, HMEFs should be used in conjunction with a second mechanical filter placed at the distal end of the expiratory limb (see below)
Medtronic	354U5876	DAR Mechanical Filter HME - Large	99.9990%	300-1500	96	Link to Medtronic Filter <a href="#">HERE</a>	
Draeger Medical	MT-4388-2007	Filter/HME Twinstar HEPA	99.9999%	300-1500	55		
Pall	BB25	Ultipor 25 w Monitoring Port	99.9990%	255 est	85	Minimum tidal volume estimated as 3 x internal volume. <a href="#">MANUFACTURER INFO</a>	
ARC Medical	6126	circuitGuard HMEF	99.99%	100-1000	32	Manufacturer Info: <a href="https://www.arcmedical.com/filtration-studies/">https://www.arcmedical.com/filtration-studies/</a>	
<b>Pediatric Patients -</b>		Smaller patients may not tolerate the dead space volume of an airway mounted HMEF. Electrostatic HMEFs with smaller dead space are typically used. These should be combined with a high quality filter at the exp limb and for sampled gas either a second filter or return the sampled gas to the scavenging system.					
Medtronic	355U5427	Infant-Pediatric Electrostatic Filter Small	99.99%	30-100	10	Smaller patients may not tolerate the dead space volume of an airway mounted HMEF. Electrostatic HMEFs with smaller dead space are typically used. These should be combined with high quality filter at exp limb and for sampled gas either a second filter or return the sampled gas to the scavenging system.	
Draeger Medical	MPO1820 MPO1825		99.99%	30-200	8 10	Several options available of different sizes. Internal design cannot be confirmed from available literature but suggests electrostatic. <a href="#">MANUFACTURER INFO</a>	
<b>Airway Filters - No Humidification</b>		For use at the patient's airway and may be suitable alternative to HMEF during low flow anesthesia, short procedures or with an active humidifier. All of these filters include a port for sampling gases for analysis.					This list includes devices that are mechanical filters only with gas sampling ports and are not capable of preserving humidity. Other strategies for humidification are required. Consider low flow anesthesia. These filters should be used in conjunction with a second mechanical filter placed at the distal end of the expiratory limb. (see Below)
	351U5979	DAR Mechanical Filter - Small	99.9990%	150-1200	42	Filters only: <a href="#">MANUFACTURER INFO</a>	
Medtronic	351U5878	DAR Mechanical Filter - Compact	99.9999%	200-1500	66		
	351U5410	DAR Mechanical Filter - Large	99.9999%	300-1500	92		
	MT-4386-2007	Filter Safestar 80	99.9999%	300-1500	80		
Draeger Medical	MT-1165-2006	Filter Safestar 55	99.9999%	300-1500	55		
	MT-4726-2007	Filter Safestar 60A	99.9999%	300-1500	60		
Pall	BB100	Ultipor 100 Filter	99.9990%	105 est	85	<a href="#">MANUFACTURER INFO</a>	
ARC Medical	7056	circuitGuard Filter	99.99%	100-1000	32	<a href="#">MANUFACTURER INFO</a>	
<b>Breathing Circuit Filters</b>		For use between the expiratory limb and the anesthesia machine Adult or Pediatric Applications. Patient size irrelevant. While airway filters without humidification (above) are suitable, devices without a sampling port are desirable to reduce the risk of an undesired leak if the sampling port is not completely closed.					Could be used as the only viral filter if there is a strategy for filtering gases sampled at the airway for analysis. (NEXT SECTION) Ideally changed between every patient but if filters are in short supply, can be re-used. Recommended to change as frequently as supplies will allow.
			VFE rating >= 99.999%			High degree of protection and likely sufficient alone	
			VFE rating of 99.9%			Commonly available. Reduced VFE can be augmented by combining with an airway filter	
<b>Water Trap Filters (Breathing Circuits &amp; Nasal Cannulas)</b>		These filters are internal to the water traps used to prevent water from entering gas analyzers. When the gas sampling line is connected to an HMEF or airway filter, there is already one level of protection. If sampled gases are returned to the breathing system or enter the room, effective viral filtering at the water trap adds an important measure of protection. If sampled gases are directed to a suction or scavenging system, high level filtration in the water trap is not as important.					This list includes devices with known VFE or filter size. In general, a hydrophobic filter with a pore rating of 0.2 microns should be sufficient. Filters rated at larger than that without a VFE rating may not be protective.
GE Medical		D-Fend and D-Fend Pro Water Traps	99.999%	N/A	N/A	Hydrophobic 0.2 micron filter. Used on GE anesthesia machines and patient monitors	
Draeger Medical		Watertrap 2	99.99981%	N/A	N/A	Hydrophobic 0.2 micron filter Used on Draeger Anesthesia Machines	
Medtronic/Oridion/Philips Microstream Capnography		FilterLine	Unknown	N/A	N/A	Hydrophobic 0.2 micron filter. Prevented bacterial contamination to the monitor in testing, VFE not tested.	
Philips (In vivo) Expression Monitor		Water Trap	unknown	N/A	N/A	Hydrophobic 0.45 micron filter. Combine with additional filtering at the airway or route gas to suction*	
Note: Sampling lines can also be protected by adding a 0.2 micron hydrophilic drug filter used to eliminate pathogens and contaminants from injected medications. An example is the filters used in epidural drug trays.							