

# WHY USE DRÄGER ORIGINAL ACCESSORIES – FLOW SENSOR

# Dräger


## Why is flow measurement important in ICU and anaesthesia ventilators?

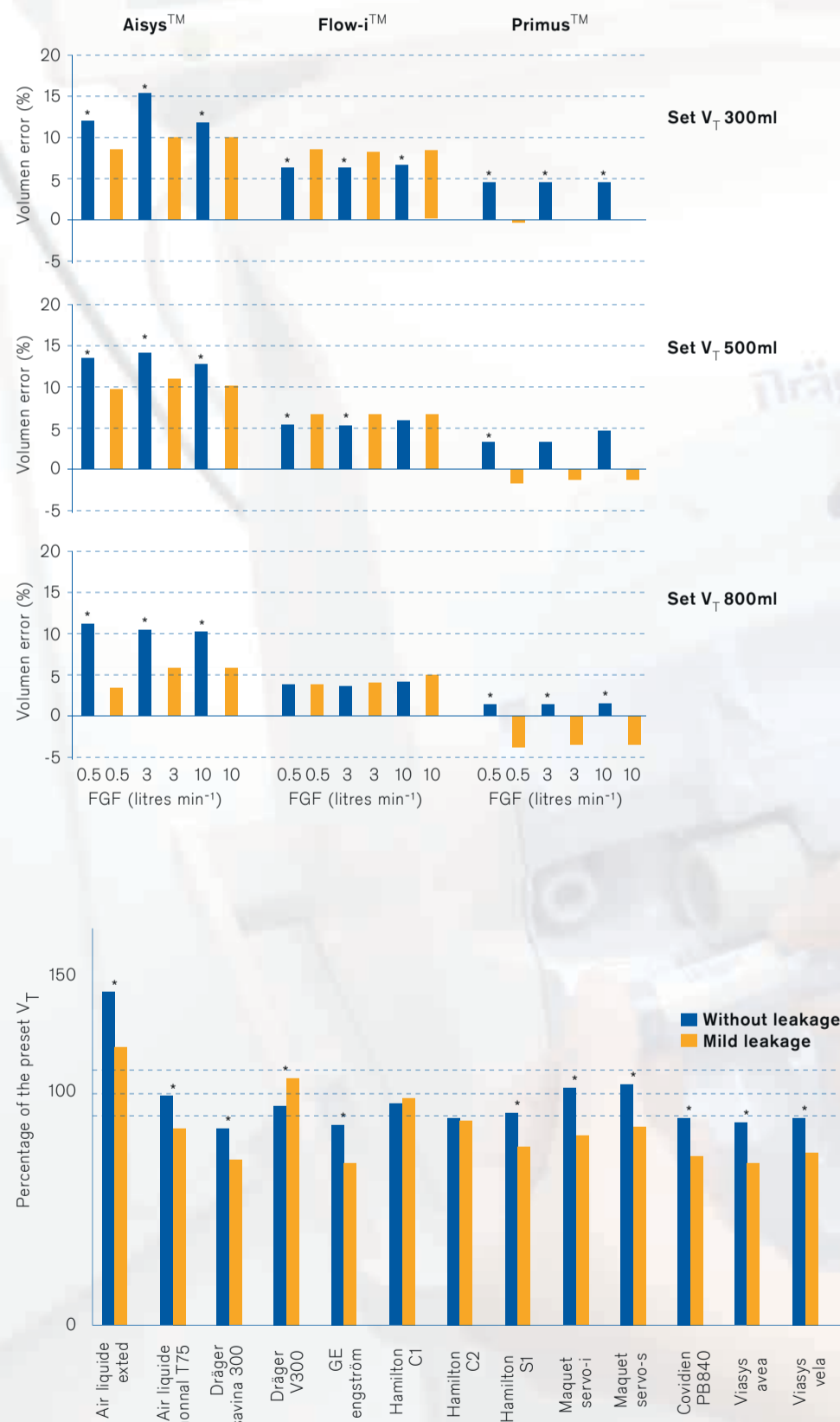
Flow measurement technology is a common way to monitor breathing volume and flow during ventilation.

Flow and volume must be accurately delivered in order to allow for lung protective ventilation.<sup>1,2</sup>

Modern ICU and OR ventilators are made for a wide range of patient categories, from neonates to adults.

 Typical tidal volumes delivered between 4 to 7 ml/kgIBW, that means from 5 to over 700 ml.

 In two recent studies by G. Wallon<sup>1</sup> and M. Garnier<sup>2</sup> it has been shown that Draeger anaesthesia and ICU ventilators, using hot wire anemometry, can deliver set tidal volumes much more accurate than other ventilators.



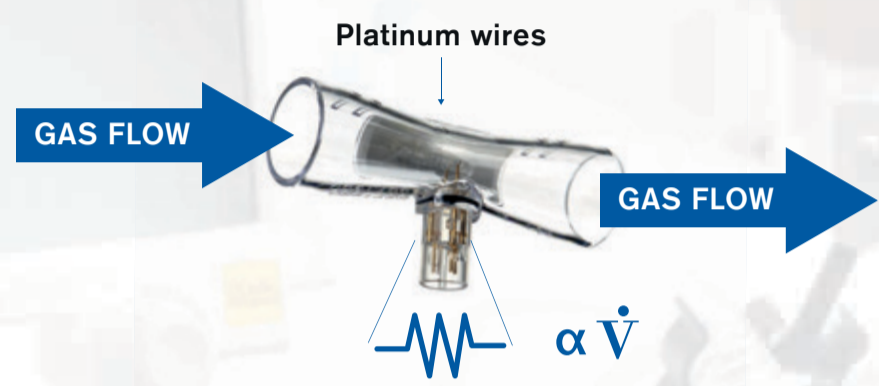
### References


- 1) G. Wallon et. al.: Delivery of tidal volume from four anaesthesia ventilators during volume-controlled ventilation: a bench study. In: British Journal of Anaesthesia, 110 (2013) 6, pp 1045 - 52
- 2) M. Garnier et. al.: Multifaceted bench comparative evaluation of latest intensive care unit ventilators. In: British Journal of Anesthesia, 115 (1): 89-98 (2015)
- 3) E. Schena et. al.: Flow measurement in mechanical ventilation: A review; In: Medical Engineering and Physics 37 (2015) 257 - 264
- 4) Putensen, C.: Advantages of spontaneous breathing in patients with respiratory failure; In: Kuhlen et. al. (Ed.) New forms of assisted spontaneous breathing, Urban & Fischer, 2001 (1st Edition), pp. 7 - 9.

## How does it work?

In Draeger devices we use hot wire anemometry, a high accurate flow measurement technology.<sup>3</sup>

1. Gases flow through the sensor where 2 platinum wires are located.
2. As the gases pass over the heated wires, they carry heat relative to the volume of gases.
3. The device measures the amount of electrical current required to maintain a set temperature for each wire.
4. Knowing the current required, the flow sensor displays the flow and the volume passed over.



 During the design and development process of Dräger ICU and OR ventilators extensive testing and validation has been done to ensure right accuracy in regards of volume delivery, alarm thresholds, monitoring accuracy and trigger sensitivity.

## What are the clinical benefits?

The hot wire anemometry has robust design under various humidity, gas mixture and temperature conditions and allows also to keep low inspiratory and expiratory resistance, reducing the work of breathing (which is the aim in supporting spontaneous breathing<sup>4</sup>).

The flow sensor is crucial to monitor and set the ventilator. Is required for:

### VOLUME PARAMETERS

VTi	VTe
<b>546</b>	<b>454</b>
MVe L/min	
<b>5.28</b>	<small>9.5 3.2</small>

### ALARM LIMITS

Check the alarm limits

MVe	L/min	<b>0.53</b>	<b>9.6</b>
Paw	mbar		45
RR	/min		<b>20</b>
VT	mL	<b>70</b>	<b>980</b>
etCO <sub>2</sub>	mmHg		
Tapn	s		<b>15</b>

### PV LOOPS

### FLOW TRIGGER

### FLOW CURVES

For all these reasons, Dräger recommends Dräger Original Accessories for anaesthesia devices and ventilators.