

DID
YOU
KNOW?

Dräger

PEEPi



What is it?

The intrinsic PEEP (PEEPi) is the actual end-expiratory pressure inside the lungs. Owing to dynamic influences of the lung mechanics (resistance, compliance, closing volume) and the ventilation setting parameters, the intrinsic PEEP may deviate from the PEEP in the upper airways.

The measuring of the PEEPi in Draeger ventilators also measures the "trapped" volume V_{trap} in the lungs, which does not participate in gas exchange.

How is it measured?

The intrinsic PEEP is measured in two phases. The device keeps the inspiratory and expiratory valves closed during measuring interval 1. This ensures that it is impossible for inspiratory gas to flow into the breathing circuit or for gas to escape from it. During this closed phase, pressure is equalized between the lungs and the breathing circuit. The device measures the pressure over time.

Measuring interval 1 is terminated:

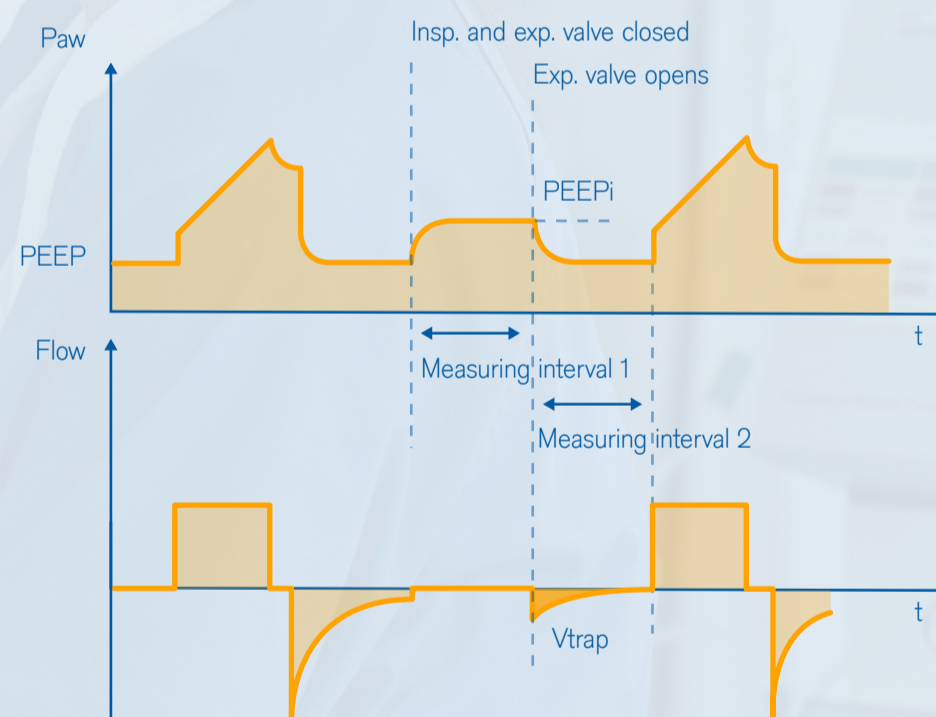
- When no pressure changes are detected any longer, but at the earliest after 0.5 seconds
- At the latest after 3 seconds in the Adult patient category and after 1.5 seconds in the Pediatric patient category.

The start value corresponds to PEEP, and the value at the end of the closed phase is the intrinsic PEEP. At the end of measuring interval 1, the device opens the expiratory valve and measures the expiratory flow generated by the intrinsic PEEP during measuring interval 2. During this period, lung pressure is allowed to decrease to the PEEP level.

Measuring interval 2 is terminated:

- When the expiratory flow has returned to 0, but after 0.5 seconds at the earliest
- At the latest after 7 seconds in the Adult patient category and after 3.5 seconds in the Pediatric patient category.

The integrated flow corresponds to the V_{trap} air volume trapped in the lungs by the intrinsic PEEP.



Why is it helpful to improve outcome?

Consequences of unmeasured intrinsic PEEP are directly impacting cardiorespiratory system (increased work of breathing, cardiovascular instability, barotrauma) during mechanical ventilation.

Ventilator settings can also interact with expiration and generate intrinsic PEEP. (1,2,3)

It's thus very important to monitor intrinsic PEEP over time and use this information to set ventilator parameters properly.



- References**
1. Brochard L. (2012) Intrinsic (or auto-) PEEP during controlled mechanical ventilation. In: Pinsky M., Brochard L., Hedenstierna G., Antonelli M. (eds) Applied Physiology in Intensive Care Medicine 1. Springer, Berlin, Heidelberg
 2. Pepe PE, Marini JJ (1982) Occult positive end-expiratory pressure in mechanically ventilated patients with airflow obstruction: the auto-PEEP effect. Am Rev Respir Dis 216:166–169
 3. Rossi A, Polese G, Brandi G, Conti G (1995) Intrinsic positive end-expiratory pressure (PEEPi). Intensive Care Med 21:522–536