Intrinsic PEEP (PEEP<sub>i</sub>), Gas Trapping and the expiratory hold manoeuvre

The Expiratory breath Hold
If there is gas trapped in the alveoli, and expiration is not sufficient in clearing that gas out, a certain amount of positive pressure will still be found in the lungs following expiration.

This positive pressure is termed “intrinsic PEEP”

An expiratory breath hold stops all flow in the airways; so you can eliminate the expiratory airway resistance (the flow dependent component of intrinsic PEEP).

Thus you are able to measure the “static PEEP”, the PEEP due to the elastic recoil of the lungs putting pressure on the gas trapped inside them.

GAS TRAPPING
VOLUME CONTROLLED ACV

The Physics of Intrinsic PEEP:
When you exhale, airflow is driven by the difference between these two pressures.

The difference is created by the elastic recoil of the lungs and the chest wall.

The flow of air out of the lungs is also resisted by the EXPIRATORY AIRWAY RESISTANCE

Typically, it takes 1.5 seconds to exhale a tidal breath.

Things which increase intrinsic PEEP are things which
- Impair elastic recoil
  - Emphysema
- Increase expiratory resistance
  - Bronchospasm
  - Airway collapse at the equal-pressure point (where intrathoracic pressure equals intrabronchial pressure)

This is called “gas trapping”, or Dynamic Hyperinflation.

The key issue is that THERE IS NOT ENOUGH TIME FOR EXPIRATION.

The solution to this problem is to increase the I:E ratio.
The patient needs more time to exhale the volume.