

Innocor[®] LCI

“Listen to the
silent lung zone”



Lung Clearance Index Measurements
from Preschool Children to Adults



COSMED
The Metabolic Company

“Lung function testing with numbers you can trust”

- LCI to detect early peripheral airway damage in CF patients
- Greater sensitivity than spirometry
- SF₆ true insoluble gas resolves typical LCI pitfalls
- Outstanding gas analyser sensitivity, accuracy and stability
- Quick and child-friendly measurement at normal breathing
- The SF₆ gas mixture and low resistance design make the test extremely comfortable



What is LCI?

LCI is a marker of overall lung ventilation inhomogeneity or distribution. It equals the number of times the patient needs to replace the lung volume to decrease the concentration of a blood insoluble tracer gas in the lungs by a factor of 40 in normal breathing at rest. As pulmonary ventilation worsens, the number of tidal breaths and the expiratory volumes required to clear the lungs are increased, as documented by a greater value. The measurement involves a tracer gas which is recorded during a multiple breath washout (MBW) test.

Why measure LCI?

LCI is a more sensitive marker of abnormalities than FEV₁, allowing early detection of disease in the smaller airways (the silent lung zone), down to small children and infants. LCI diagnostic tests are particularly important in relation to peripheral lung diseases including cystic fibrosis (CF), COPD, and asthma.

Why use SF₆ and not N₂?

Innocor® LCI stands out from traditional methods by using extremely small amounts (0.2%) of SF₆ tracer gas in a closed circuit. This patented technology represents an innovative solution to typical pitfalls: no influence of N₂ back-diffusion into the lungs from blood and tissues, no impact of pure O₂ on breathing pattern or gas exchange, considerably shorter testing time and no sensitivity to inspiratory leaks.

Why choose Innocor® LCI?

The advanced combination of wash-in and wash-out techniques makes the total test time in repeated tests significantly

shorter and eliminates the need for waiting time between manoeuvres or in case of manoeuvre failure (e.g. coughing or leaks). Simply repeat the test when ready.

The extremely low resistance of the specifically designed breathing circuit and avoiding the use of irritating O₂ concentrations guarantee the perfect patient experience for both adults and children.

During a rapid rebreathing manoeuvre, where the patient breathes a slightly oxygen enriched gas mixture from a rubber bag through a CO₂ absorber, the tracer gas SF₆ is washed in and equally distributed in the lungs. Rebreathing is significantly quicker than a multiple-breath open-circuit manoeuvre. When wash-in is completed as determined by the device, the multiple breath wash-out test starts.

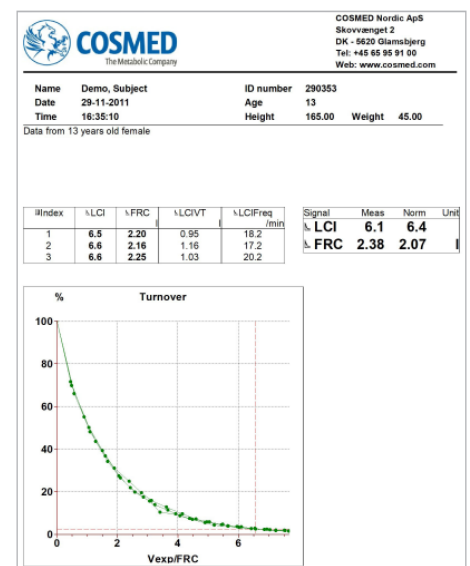


Patient interface for children and adults.

In conventional N₂ wash-out, N₂ needs to be washed in to normal alveolar level by breathing room air between repeated tests or in case of manoeuvre failure, which is time-consuming.

With Innocor® LCI, the rebreathing wash-in manoeuvre can be initiated any time as the tracer gas will equilibrate no matter what starting concentration in the lungs.

The use of a foreign tracer gas means that inspiratory leaks do not affect the MBW manoeuvre, as air leaking in during inspiration does not contain the tracer gas as opposed to N₂ in air when using 100% O₂ for N₂ wash-out.



Innocor® LCI printout layout.

Innocor® LCI Key Features

- **LCI to detect early peripheral airway damage in cystic fibrosis (CF) patients**

LCI is a promising marker in the field of cystic fibrosis. The detection of early-stage lung disease is critical to guide clinical treatment and improve patient's outcome.

- **Greater sensitivity than spirometry**

LCI is a more sensitive marker of abnormalities than FEV1, allowing early detection of disease in the smaller airways, down to small children.

- **SF₆ true insoluble gas resolves typical LCI pitfalls**

Thanks to the use of SF₆ tracer gas the measurement is not affected by N₂ back diffusion, O₂ influence on breathing pattern and possible inspiratory leakages.

- **Outstanding accuracy**

The patented fast-responding photo-acoustic infrared gas analyser guarantees high sensitivity, accuracy and reliability.

- **Child-friendly measurement technique**

A simple and fast manoeuvre performed while the patient is breathing normally through the measuring device.

- **High patient comfort**

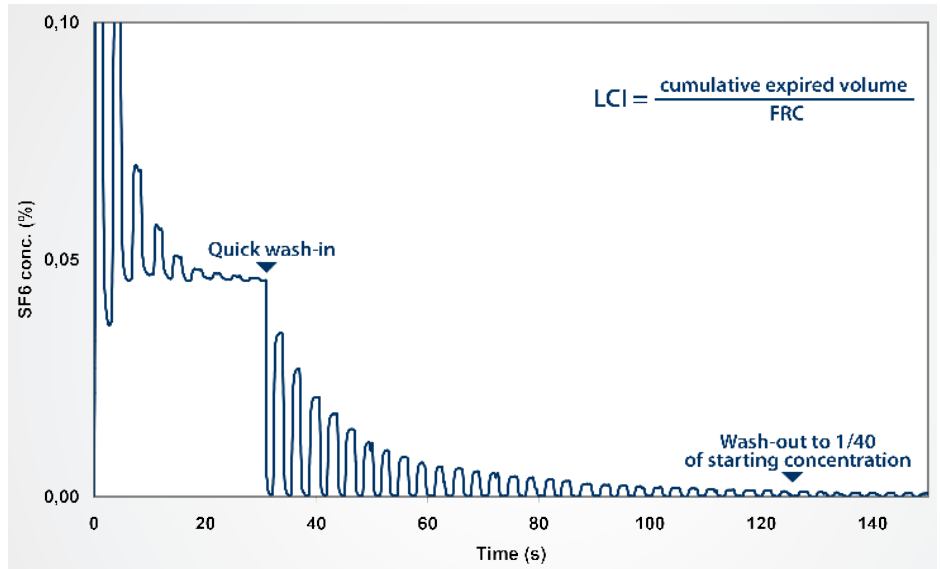
The extremely low resistance from the breathing circuit and the absence of uncomfortable gas mixture (100% O₂) ensures the perfect patient experience.

- **Reduced downtime**

The advanced wash-in wash-out technique makes the test faster than traditional methods and eliminates the needs for waiting time between manoeuvres or in case of manoeuvre failure.

- **No need for external O₂ supply**

Tracer gas provided in integrated test gas cylinder.



LCI test showing a rebreathing curve for quick wash-in of tracer gas followed by MBW in open circuit.

Innocor® LCI Technologies

Innocor® LCI utilizes COSMED's proprietary gas analyser technology for measuring the tracer gas sulphur hexafluoride (SF₆) and CO₂ continuously and simultaneously.

The advanced analyser is a photoacoustic infrared type which combines a fast response with unmatched sensitivity, accuracy and inherent stability.

The patented method makes the test significantly shorter, with minimal use of SF₆ compared to conventional methods. No daily calibration is required – only a yearly calibration check.

The oxygen sensor uses laser diode absorption spectroscopy, meaning no limited life parts. Room air is used for calibration.

A Nafion sampling tube ensures optimal humidity removal.



Intuitive Windows Software for effortless operations.



Space efficient and portable with integrated lifting slot.

Miniature gas cylinder with self-dispensing valve for rebreathing gas mixture.

Test capacity is expanded typically tenfold by automatic dilution with air, thereby avoiding a bulky external cylinder.

PC interface



Quick connector panel for rebreathing valve and SpO₂ sensor.



Pneumatic rebreathing valve with replaceable insert for maximum hygiene.



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