

# EXHALYZER D

Pulmonary function testing system for neonate to adult patients



## Your advantage:

**Full range integrated system for pulmonary function testing**

**Optional FRC / LCI measurement (SF<sub>6</sub>- or N<sub>2</sub> - washout)**

**Optional Resistance and compliance measurement (Shutter)**

**Tidal breathing analysis and spirometry**

**Upgradeable**



**ECO MEDICS AG, specialist in innovative gas analysis systems for respiratory measurement and medical science, introduces the 3rd EXHALYZER generation. The first digital state of the art lung function testing device for prematures, neonates and pediatric patients. The compact system incorporates all elements of a fully-equipped instrument to exceed your highest expectations.**

## Main features at a glance

EXHALYZER<sup>®</sup>D, a unique system for continuous, simultaneous measurement and display of various pulmonary function parameters even on non-cooperative neonates, paediatrics up to adults. The combination of flow, volume and pressure measurement with optional modules for: capnography, oximetry, exhaled nitric oxide, FRC / LCI measurements and airway occlusion (lung mechanics) facilitating an integrated assessment of the patient.

The system is capable to perform all lung function test procedures as described in the book "Infant Respiratory Function Testing", Paediatric Pulmonary Function Testing and in the ATS / ERS standard for inert gas washout.



FRC/LCI Set up

- 1) Gustafsson PM. et al; Novel methodology to perform sulfur hexafluoride (SF<sub>6</sub>) based multiple breath washin and washout in infants using current commercially available equipment. *J Appl Physiol* (August 4, 2016)
- 2) Robinson Paul D. et al; Inert Gas Washout: Theoretical Background and Clinical Utility in Respiratory Disease. Karger AG, Basel (June 12, 2009)
- 3) Robinson Paul D. et al; Consensus statement for inert gas washout measurement using multiple- and single breath tests. *Eur Respir J* 2013.
- 4) Robinson Paul D., Goldman MD, Gustafsson PM. Inert gas washout: theoretical background and clinical utility in respiratory disease. *Respiration* 2009

## The new digital ultra sonic flow meter:

Digital is a synonym for highest precision. The patented ultrasonic transit-time measurement technique, a benchmark in precise flow and volume measurement, enters the 2100 century. The sampling frequency of 200 Hz and small technical dead space enables applications on smallest prematures.

Changes in the gas composition, turbulence, humidity or temperature of the respiratory flow do not influence the accuracy of measured flow and volume. Exchangeable dead space reducers guarantee always highest resolution for the measurement and adaptation to the patient. Even the best can be improved.

## "SPIROWARE 3.x" with SQL database:

The PC based software-package of the EXHALYZER<sup>®</sup>D, which allows the operator to measure and record data obtained during tidal breathing or for one selected breath cycle of the patient.

On the basis of standard or user-specified criteria the software selects the most suitable data set and displays graphics combined with patient data. Pre-programmed records in accordance to ATS / ERS standards or custom specific recording may be used, validation of medical treatment, and screening.

## EXHALYZER D:

Optional and upgradeable system for measuring flow, volume, FRC / LCI, lung mechanics, ins- and expiratory volumes, CO<sub>2</sub>, O<sub>2</sub> and nitric oxide, enables accurate determination of the patient pulmonary condition.

## Specifications EXHALYZER D

### Flow and pressure measurement

Flow range:	± 0.5 l/s (DSR small) ± 1.5 l/s (DSR medium) ± 8 l/s (DSR large)
Volume resolution:	0.6 / 1 ml
Accuracy:	± 2 %
Dead space:	1.9 ml (DSR small) 7.2 ml (DSR medium) 20 ml (DSR large)
Resistance:	< 0.15 kPa/ 0.5 l/min
Sampling frequency:	200 Hz

### FRC / LCI infant measurement (option)

Principle:	SF <sub>6</sub> washin / washout
Application:	spont. breathing
Cont. flow:	adjust. up to 250 ml/s

### Nitrogen washout FRC module (option)

Principle:	N <sub>2</sub> washout by 100 % O <sub>2</sub>
Maneuvers:	Single and multiple breath tests
Application:	spont. breathing
Cont. flow:	up to 1250 ml/s

### NO measurement (option)

Measurement range:	0.1 to 5000 ppb
Detection limit:	0.06 ppb *
Rise time (T90):	< 100 ms
Sampling rate:	10 Hz
Sample flow rate:	select. 100 or 300 ml/min *

### CO<sub>2</sub> measurement (option)

Principle:	Mainstream, self calibrating
Measurement range:	0 to 14 % 0 to 14 kPa
Accuracy:	2 mmHg (0 to 40 mm Hg) 5 % of read. (> 40 mmHg) 10 % of read. (> 77 mmHg)
Rise time (t90):	100 ms

### Oxygen measurement (option)

Principle:	Side stream, laser diode
Measurement range:	2 to 100 %
Resolution:	0.01 %
Accuracy:	0.3 %
Rise time (t90):	100 ms
Sampling frequency:	100 Hz
Sample flow:	200 ml/min

### Airway occlusion module (option)

Modes of operation:	Automatic (flow triggered), manual
Response time:	< 10 ms
Closing time:	select. 50 to 1500 ms
Pressure range:	-120 to 120 mbar

### General

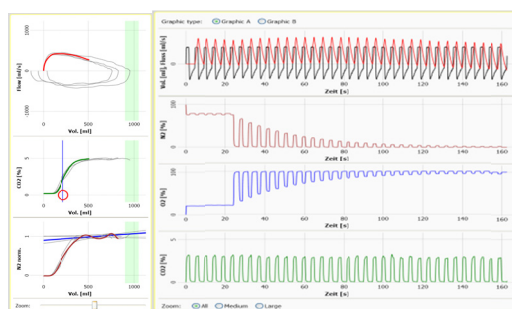
Temperature range:	10–40 °C
Humidity tolerance:	5–95 % rel. humidity (non-condensing)
Supply voltage:	100 - 240 V, 50/60 Hz
Power required:	230 VA max.
Data interface:	USB Mini
Data acquisition:	SPIROWARE® 3.x
Weight (basic module):	5 kg (w/o PC and printer)
Dimensions (h x w x d):	100 x 550 x 400 mm 4 x 21.7 x 15.8 inch

### System requirements

Pentium i5 Processor or better, Microsoft Windows WIN 7, .NET Framework 4.0 or higher, 16MByte RAM, 10GB free space on hard disk, XGA-Graphics or better, USB 2.0 or higher

(Note: PC, Printer, calibration gases and zero-air supply are not part of our delivery).

\* depending on sample flow



Nitrogen Washout Test

ECO MEDICS reserves the right to change these specifications without notice. Manufactured by ECO PHYSICS

