

EXHALYZER®D

Infant pulmonary function testing system for prematures, neonates and pediatrics



Your advantage:

Integrated system for infant pulmonary function testing
Optional FRC measurement (SF₆- or Helium washout)
Optional Resistance and compliance measurement (Shutter)
Optional calorimetry
Optional forced volume module (Squeeze / hug system)
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®D, a unique system for continuous, simultaneous measurement and display of various pulmonary function parameters even on non cooperative prematures, neonates and pediatrics. The combination of flow, volume and pressure measurement with optional modules for: capnography, oximetry, exhaled nitric oxide, FRC measurement, forced ins- and expiratory maneuvers 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" (1) and in the ATS / ERS standards (2, 3, 4).



The airway occlusion module - Shutter

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 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®" with "Add on Tools":

The PC based software-package of the EXHALYZER®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 for patient history record, validation of medical treatment, and screening. The SPIROWARE® software program with its "Add on Tools" enables easy data exchange due to HTML and EXCEL data format.

EXHALYZER®D:

Optional and upgradeable system for measuring flow, volume, FRC / LCI, lung mechanics, forced ins- and expiratory volumes, CO₂, O₂ and nitric oxide, enables accurate determination of the infant patient pulmonary condition.

1) J. Stocks, P.D. Sly, R.S. Tepper, W.J. Morgan. *Infant respiratory function testing*. Wiley-Liss, New York 1996

2) Frey U, Stocks J, Coates A, Sly P, Bates J, Specifications for equipment used for infant respiratory function testing. *Eur Respir J* 2000; 16: 731 - 740

3) Sly P, Tepper R, Henschen M, Gappa M, Stocks J, Tidal forced expirations. *Eur Respir J* 2000; 16: 741 - 748

4) Bates J, Schmalisch G, Filbrun D, Stocks J, Tidal breath analysis for infant pulmonary function testing. *Eur Respir J* 2000; 16: 1180 - 1192

Specifications EXHALYZER®D

Flow and pressure measurement

Flow range:	± 0.5 l/s (DSR small) ± 1.5 l/s (DSR medium)
Volume resolution:	0.6 ml
Accuracy:	± 2 %
Pressure range:	-120 to 120 mbar
Dead space:	1.9 ml (DSR small) 7.2 ml (DSR medium)
Resistance:	< 0.15 kPa/ 0.5 l/min
Sampling frequency:	200 Hz

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. 110 or 330 ml/min *

FRC / LCI measurement (option)

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

Airway occlusion module (option)

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

CO2 measurement (option)

Principle:	Mainstream, self calibrating
Measurement range:	0 to 99 mmHg 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)
Response time:	< 120 ms

Oxygen measurement (option)

Principle:	Side stream, laser diode
Measurement range:	5 to 100 %
Resolution:	0.1 %
Accuracy:	0.5 %
Response time:	120 ms
Sampling frequency:	100 Hz

RV-RTC module (option)

Raised volume pressure:	0 to 35 mbar
Compression pressure:	0 to 120 mbar
Rise time (jacket small):	< 100 ms
Compression jacket:	4 sizes (2 to 12 kg BW)
Measurement range:	-120 to 120 mbar

General

Temperature range:	5–40 °C
Humidity tolerance:	5–95 % rel. humidity (non-condensing)
Supply voltage:	100 - 240 V, 50/60 Hz
Power required:	850 VA max.
Data interface:	RS 232 (standard)
Data acquisition:	SPIROWARE® with "Add on Tools", PC program
Weight (basic module):	10 kg
All options	80 kg (w/o PC and printer)
Dimensions (h x w x d):	1170 x 550 x 800 mm 46 x 21.7 x 31.5 inch

System requirements

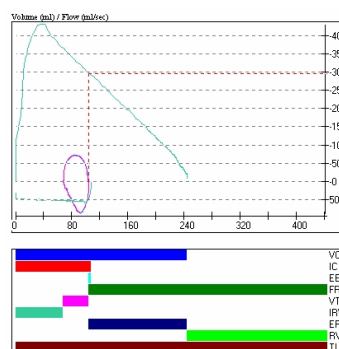
PC Pentium 3 or higher
Microsoft Windows XP and Internet Explorer
(V 5.0 or higher), CD ROM and 3.5" disk drive
16 MB RAM, 10 MB free disk space
XGA or better graphics adapter

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

* depending on sample flow



Fully loaded system (RV-RTC module)



Lung volumes, graphics by SPIROWARE®

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