MES Sp. z o.o.
Founded 1993

spirometer above the standards

LUNGTEST BASIC

100% of knowledge,
passion and experience
since 1993

BASIC LUNGTEST

Lungtest Basic is a small stationary spirometer operated by any PC with software implemented in any version of Microsoft Windows system. When you need full-function spirometry and space is at a premium, the Lungtest Basic is a most fitting solution. This small, portable system is powered by the advanced software, so you can be sure it will do more than meet your testing and data management needs.

Lungtest Basic advanced spirometer - a basic diagnostic tool of human respiratory system - spirometer with great development prospects

A basic version of Lungtest Basic includes all features and hardware for spirometry testing (FVC, SVC, MVV and Pre/ Post Bronchodilatation) however, through spirometer's develop of additional measurement modules may the basis to build PFT laboratory, it means, Lungtest Basic can be connected with our Lungtest Lab and Lungtest Lab Body. This solution gives the opportunity to scale at any time to a more complex configuration.

Lungtest Basic fully complies with all ATS/ERS standards and is the perfect tool for accurate and reliable data in any hospital department or physician's office. Lungtest Basic is a compact device with a modern design, easily installed on any trolley or a desk. Lungtest Basic owes the perfect functionality to many years of experience of top class engineers-enthusiasts.

Lungtest Basic designed to work with MES DV40 flow sensor, it provides superior infection control and needs no recalibration or warm-up between patients. All powered through a single USB connection.

MES DV40 pneumotachograph head with digital converter of air flow

Flow measurement is performed with use of the unique MES DV40 pneumotachograph head patented by MES. Low resistance for flow, small dead space and low weight ensure patient conditions similar to the natural. No moving parts in the headpiece and a complete lack of sensitivity to humidity provide high accuracy and noise immunity. Sterilization of the entire headpiece gives a complete safety to tested subject. We introduced our new invention in the construction of the device which enables to eliminate air hoses, transmitting differential pressure signals from our MES DV40 pneumotachograph to a sensor situated in the housing of the device. We developed and patented a flow measuring system with a digital converter of air flow. Its essence is to place pressure sensors with digital converter directly on the MES DV40 pneumotachograph head and transmitting the measured flow signal digital by means of a cable. We can say that we have the digital pneumotachograph now which will be a key element in all of our new devices. This solution also prevents a signal distortion during the transmission over long cables and increases the ease of movement of the subject's head.

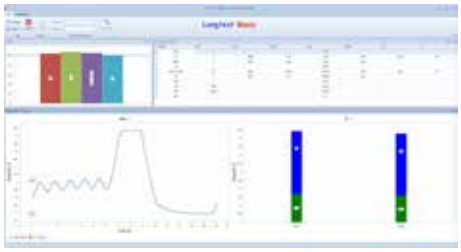
Basic advantages:

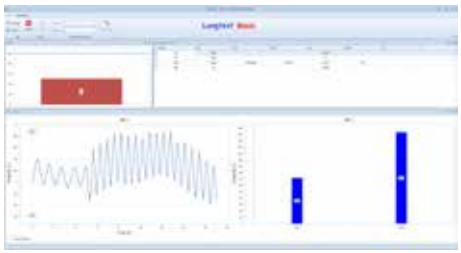
- lightweight, low-resistant MES DV40 pneumotach headpiece without movable elements
- air tubes for flow measurement eliminated and digital signal is sent by cable to the main unit
- immediately ready to use after replacing a headpiece
- replaceable measurement heads – with no anti-bacterial filters – completely
- protect the examined patient from infections of the respiratory tract
- measuring air flow system with digital converter placed inside a coupler of the MES DV40 pneumotachograph close to headpiece
- automatic ambient conditions measuring system
- automatic control of the test correctness according to ATS/ERS standards
- automatic assessment of the quality of the correctly performed examination in the A-F scale
- real-time visualization of graphs: flow-time, volume-time time waveforms and flow- volume loops
- possibility of measurement's interrupting in any time for control of reached results and starting measurement again
- motivation system for children
- automatic diastolic test appraisal
- possibility to turn on the automatic diagnosis system
- comparison of results with predicated values
- computation of standard deviations and percentiles
- presentation of measured values against predicted values
- edition of the test report
- summary report provides data for a simple and easy interpretation
- test data exporting to standard statistic programs
- open-architecture database with flexible software system
- database without any limitations with quick searching for patients and examinations
- software compatible with MS Windows
- user-friendly software
- possibility of installation on your own PC
- numerous upgrading options
- low maintenance costs and easy servicing
- providing free of charge upgrades during and after warranty period

Patient's data

Lungtest Basic system allows entering the following patient's data: name, surname, date of birth, weight, height, sex, identification number, the data listed above plus address, place of work, insurer, type of illness, attending doctor, diagnosis, history number, hospital ward, name of the person carrying out the test.

Standard tests





Spirometry - the determined parameters: VC, IC, ERV, TV, IRV, MV, BF

Flow/volume loop - the determined parameters: FEV0.5, FEV0.75, FEV1, FEV2, FEV3, FEV6, FVC EX, PEF, MEF75, MEF50, MEF25, MEF@FRC, FEF75/85, FEF25/75, FEF 0.2-1.2, VPEF, TPEF, FET, TPEF%FET, MEF50% FVC EX, FEV1% FVC EX, FEV1% VC, FEV1/PEF, VCmax, FEV1% VCmax, FEV1% FEV3, FEV1% FEV6, BEV, BEV%FVCex, TC25/50, MTT, AEX, FVC IN, FIV1, PIF, MIF50, FIT, TPIF, VPIF, TPIF%FIT, FEV1% FVC IN, MEF50/MIF50, PEF/PIF, FEV1/FIV1, FET%FIT, TTOT

Maximal Voluntary Ventilation - the determined parameters: MVV, BF, BR

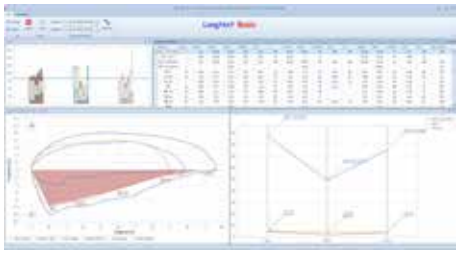
Pre/ Post Bronchiodilatation

When a test is repeated after intake of the medicine, results of the second test are related to the results of the test preceding the medicine intake. Each initial test is marked as PRE and the test following the medicine intake is marked as POST to facilitate interpretation of the recorded results. The software allows automatic evaluation of a diastolic test consistent with ERS.

Predicted values

Usually the due values are calculated according to ERS but the Lungtest Basic software currently contains 31 authors including GLI, Kuster, NHANES III, Hankinson, Falaschetti etc.

Data base



Patient data are stored in Microsoft SQL database, providing the flexibility to access, manipulate and report data in multiple ways, as well as transmitting the results to standard statistic programs and net using HL7 protocol.

Trend reports

Trend reports allow printing and graphing data from previous patient visits so that progress can be monitored.

Printouts

Lungtest Basic allows printing of the results and comparisons of results in color or black and white in formats designed by the User.

How to diagnose a non-cooperative patient's respiratory system?

Obtaining the necessary cooperation between the patient and the staff operating a spirometer is sometimes impossible (small children, people with limited perception, people knowingly avoiding cooperation, unconscious patients etc.) and other, objective research methods of respiratory mechanics research which do not require collaboration on the part of the respondent come to the rescue.

Optional modules available in the Lungtest Basic

RRS (Respiratory Resistance)
Breath Pattern
Breath Pattern with P 0.1
Breath Pattern E
DRT (Diaphragm Relaxation Time)
PIPE (Pressure Inspiration
Pressure Expiration)
Ambient Condition Electronic Module.

RRS-respiratory resistance (occlusion method)

Low patient collaboration required so it is ideal for testing children. Respiratory resistance is measured with occlusion method. Air flow is interrupted with a MES patented shutter closes at the beginning of inspiration (or expiration) and opens in 100, 150, 200, or 250 ms, as required. Pressure is measured at the level of the oral cavity and air flow is measured behind the closing valve. Low patient collaboration required so it is ideal for testing children.

UNIQUE SOLUTION!

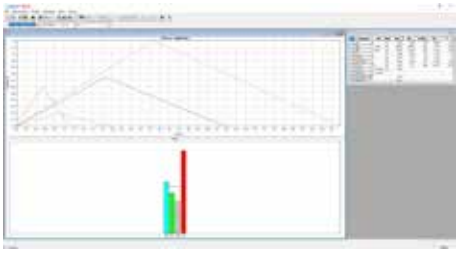
Patented shutter

While producing the equipment, the MES Ltd company places special emphasis on the patient's protection against infections. The pneumotachographic head that we have patented offers the possibility of using sterile measurement elements for each patient during casual spirometric examinations. The new construction of shutter for the RRS, P0.1 and bodyplethysmography examinations is a development based on the idea of easy sterilization of elements used during the examinations in the area of respiratory mechanisms. The idea behind the construction of new shutter is the elimination of potential threats of infection during the examination performance. The MES shutter is driven by a rotary solenoid built-in into the ergonomic plastic casing. An element closing the air flow is replaceable and designed for sterilization. The whole item consists of one drive and many replaceable shutters.

Advantages of the new shutter construction:

- sterile closing element for each patient
- easy sterilization of the whole closing element
- small dead space of the closing element
- small flow resistance of the closing element
- low price of the replaceable closing elements
- drive of the closing element placed in ergonomic casing
- fast and easy replacement of the closing element
- universal construction to be used in the RRS, P0.1 and Bodyplethysmography examinations
- closing element is not susceptible to dampness

Breath Pattern and Breath Pattern with P0.1



Modern diagnostic systems provide objective measurements of breath mechanics and do not require co-operation on the side of the patient.

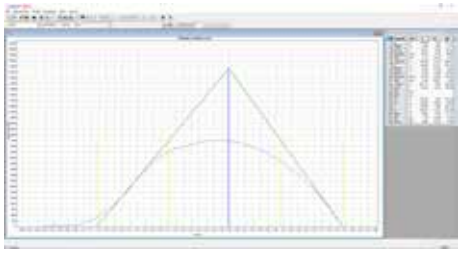
- Breath Pattern
- Breath Pattern with P0.1

Breath Pattern E

Modern diagnostic system for infants and small children below 3 years old provide objective measurements of breath mechanics which does not require co-operation on the side of the patient.

PIPE (Maximal Static Inspiratory and Expiratory Pressure)

Measurement of the maximum static inspiratory pressure that a subject can generate at a mouth (PI_{max}) or the maximum static expiratory pressure (PE_{max}) is a simple way to gauge inspiratory and expiratory muscle strength. Recorded values of PI_{max} and PE_{max} can be compared with published normal values.



DRT (Diaphragm Relaxation Time)

DRT is a test for evaluation of respiratory muscle fatigue. Analysis of inspiration pressure changes measured with a resistor allows determination of a lot of parameters which describe dynamics of diaphragm relaxation. The test is very useful for evaluation of diaphragm muscle training level.

Ambient Condition Electronic Module

All spirometry volume values should be reported at BTPS. The calibration is done under ATP i.e. ambient conditions. This means current temperature, current barometric pressure and current humidity. A volume change occurs during expiration the measurement on the patient because of the changes in temperature and humidity. These changes are corrected to BTPS conditions and the conversion from ATP to BTPS occurs automatically. Ambient Condition Electronic Module is hung on a wall and connected with PC via USB, allows continuous acquisition of ambient condition parameters in laboratory.

Basis for the PFT laboratory

Lungtest Basic spirometer can be the base for the PFT system it means can be connected with all Lungtest Lab modules and in line operated. This solution gives the opportunity to scale at any time to a more complex configuration without having to send Lungtest Basic to the manufacturer.

Technical specifications of the Lungtest Basic

Flow rate and volume measurement:

- measuring headpiece	MES DV40 (or DV40e)
- dead space	38 ml (or 20 ml)
- flow range	±20 l/s
- flow resolution	1 ml/s
- usable flow resolution	10 ml/s
- volume measurement range	0 - ± 10 l (0 - 20 l)
- usable volume resolution	10 ml
- accuracy	< 2 %
- headpiece resistance	< 0,9 cm H_2O/l/s *(at 14 l/s flow rate)*
- ventilation range	300 l/min

General data:

- power supply	230 V ±10 %, 50/60 Hz
- power intake	15 VA
- dimensions (L x W x H)	200 x 200 x 100 mm
- weight	0,7 kg

Ambient conditions:

- humidity	0 - 100 %
- temperature	0 - +50 °C
- atmospheric pressure	500 - 1200 hPa

Innovative and modern solutions in the spirometer Lungtest Basic

Used patents:

- Patent 173767 Developed and patented by MES the pneumotachograph MES DV40 headpiece for flow measurement
- Patent 195041 Developed and patented by MES the fast coupler, for quick and easy replacement of the pneumotachograph MES DV40 headpiece
- Patent 213374 Developed and patented by MES shutter for blocking airflow path close to mouth
- Patent 230143 Developed and patented by MES digital flow converter, placed directly on the pneumotachograph MES DV40 headpiece

Certificates: CE 1011, ISO 13485:2016

Advantages of our pneumotachograph head with digital converter (patents: nr 173767 and 230143)

- cable transmission of the measured flow signal
- headpiece cable connected with main unit
- pre-test calibration is not required
- high accuracy and resolution
- parameters do not change in the course of a test
- no moving elements
- sterile for each patient
- easily sterilizable as a whole
- lightweight
- small dead space
- low flow resistance
- no heating system
- insensitive to moisture
- life period - 10.000 tests

MES®

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