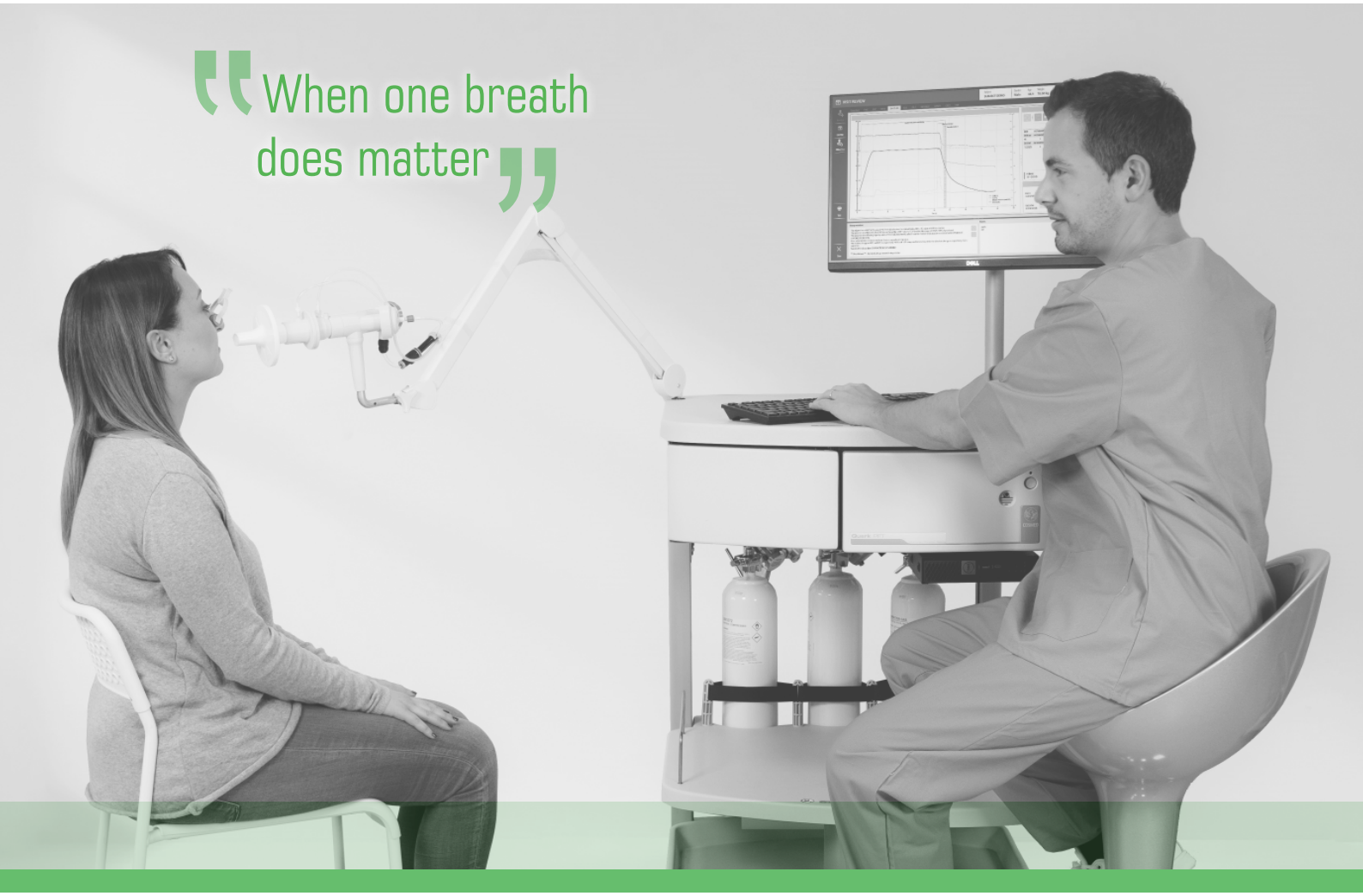
Quark PFT

Pulmonary Function Testing



Full Modularity and Networking for Truly Customised Lung Function Testing Solutions

COSMED
The Metabolic Company

“Full laboratory system that maximizes the technology and testing abilities to give all-round performance, high-quality measurements and excellent repeatability[1]”

[1] *“ERS 2004: Lung function testing equipment: a manufacturer’s unbiased viewpoint” K. Hogben, 2004 ERS Buyers’ Guide to Respiratory Care Products p. 42-64*

- **Modular and Expandable Lung Function and Metabolic Testing in One-Single System**
- **Powered by OMNIA The most advanced software platform in the industry**
- **Compliant with ATS/ERS 2019 Spirometry and 2017 DLCO Guidelines**
- **VA Calculation with Mass Balance Technique during DLCO**
- **Best-in-Class Flowmeters for Lung Function and Cardio Pulmonary Exercise Testing**

Quark PFT is a modular and compact Pulmonary Function Testing system that allows accurate, repeatable, low cost tests over time. It has been designed to meet any physician’s requirement, whether is needed for a fully featured PFT Lab or a private practice.

Quark PFT is powered by OMNIA, the ultimate software platform entirely designed and developed by COSMED. OMNIA provides an innovative and user-friendly interface that allows operators to navigate and access features and testing quickly without the need of a long training. OMNIA is available in a multi-language environment either for stand-alone or small to large network environment. All Quark PFT modules comply with ATS/ERS standards.

Design

- **True modular design architecture.** It allows to configure Quark PFT according to any kind of requirement. This cost-effective solution gives the opportunity to scale at any time to a more complex configuration.
- **Low running costs.** The design architecture eliminates the procedure of ordinary maintenance and solve easily and rapidly any technical problem by replacing a board.
- **Powered by OMNIA.** A contemporary, simple and ergonomic software interface with intuitive workflow and hierarchy. Based on either Express or Standard SQL database to store unlimited data securely and guaranteeing lifetime data ownership.
- **Simplified workflow.** OMNIA user interface and its workflow management have been designed to simplify procedures and to reduce testing time.
- **Quick and easy calibration procedures.** Standard (i.e. flowmeter and gas sensors) and advanced calibration procedures to verify accuracy, including pneumotach linearization, and verification of all flowmeters.
- **Automatic interpretation of tests.** Based on the latest scientific guidelines supported by a powerful algorithm that automatically processes results and provides interpretation text strings, including numerical results and graphical data (pictograms).
- **Network ready.** OMNIA is available both as a single stand-alone workstation or in a client/server configuration for small or very large network environments.

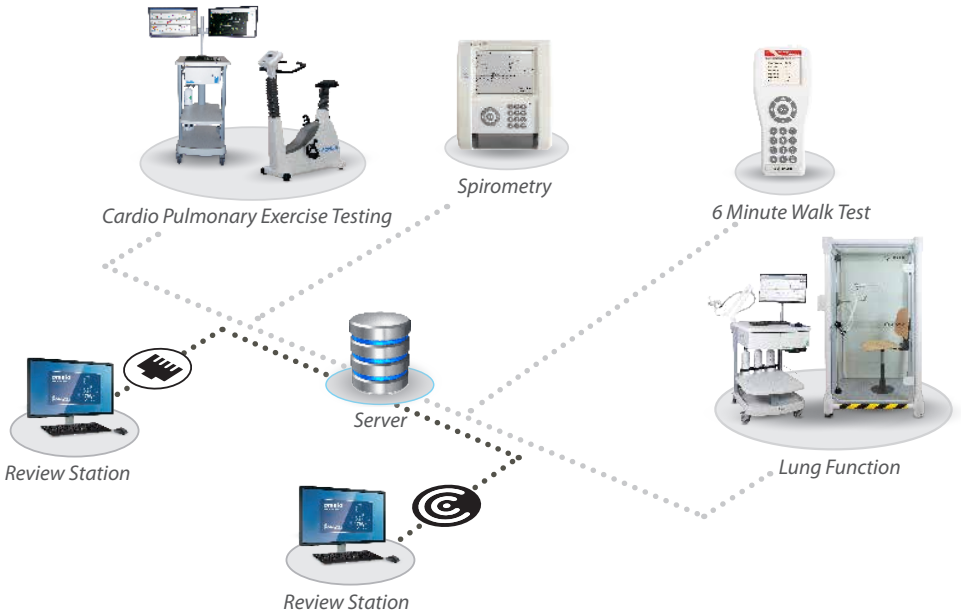
Networking

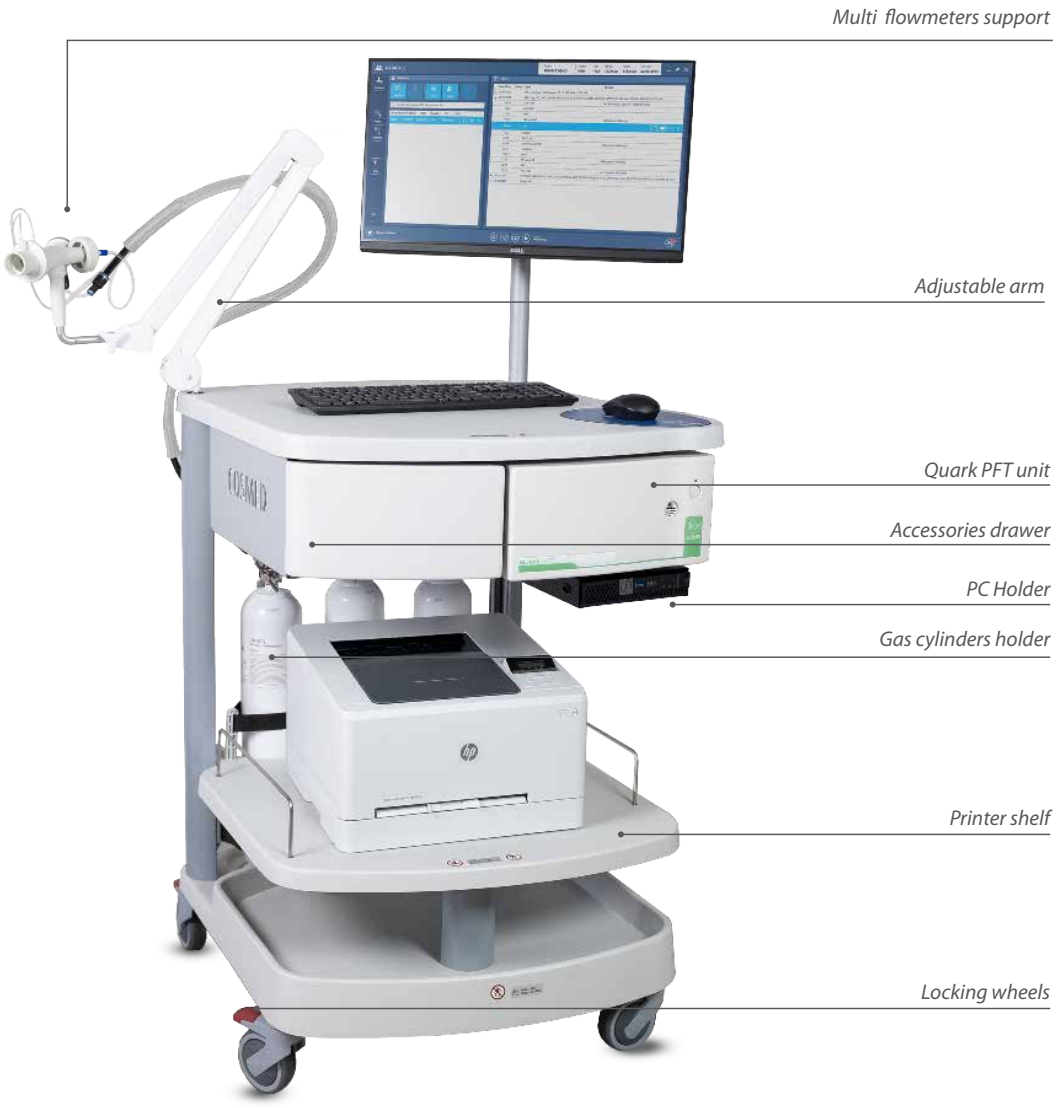
OMNIA Network allows to share a single database in either a small network (LAN) or a large network (WAN) environment.

OMNIA Network is based on a Client/Server architecture and allows to run different COSMED devices through simultaneous access of data and run tests via an unlimited number of COSMED products.

- The network license includes five clients (simultaneous access) and can be extended by adding additional licenses.
- A user management system allows to define users (Physician, Technician, Administrator, etc.) and assign specific roles to each user or user group.

- Multi format data export including XML, XLS, PDF and GDT. OMNIA can exchange data with Hospital Information Systems (HIS) via HL7 and GDT.
- Exchange data with Hospital Information Systems (HIS) or Electronic Medical Records (EMR) via HL7 protocol. Manage shared data through a dedicated worklist with visits status always updated.
- Access and security compliancy according to international guidelines.
- Based on standard SQL database to store data securely.





Spirometry

Quark PFT in its basic configuration includes all features and hardware for spirometry testing (FVC, SVC, MMV and Pre/Post Bronchial Provocation).

- Choice of different flowmeter configurations (pneumotach or turbine).
- New Trial Selection and Quality Control functions (in compliance with ERS/ATS guidelines).
- Innovative pediatric incentivation with user-defined effort grade on both volume and flow.
- GOLD COPD Interpretation on FVC PostBD.
- Automatic control of the Broncho-Challenge protocols with or without the integrated dosimeter.
- Latest Global Lung Initiative (GLI) predicteds (including Z-score).
- Possibility to download Six Minute Walk Test data (Spiropalm 6MWT).

Body Plethysmography (TGV/RAW)

"Gold Standard" lung volume measurement can be performed with the addition of a variable-pressure plethysmographic body box module. The large cabin provides comfort and ease of access both for adults and special populations.

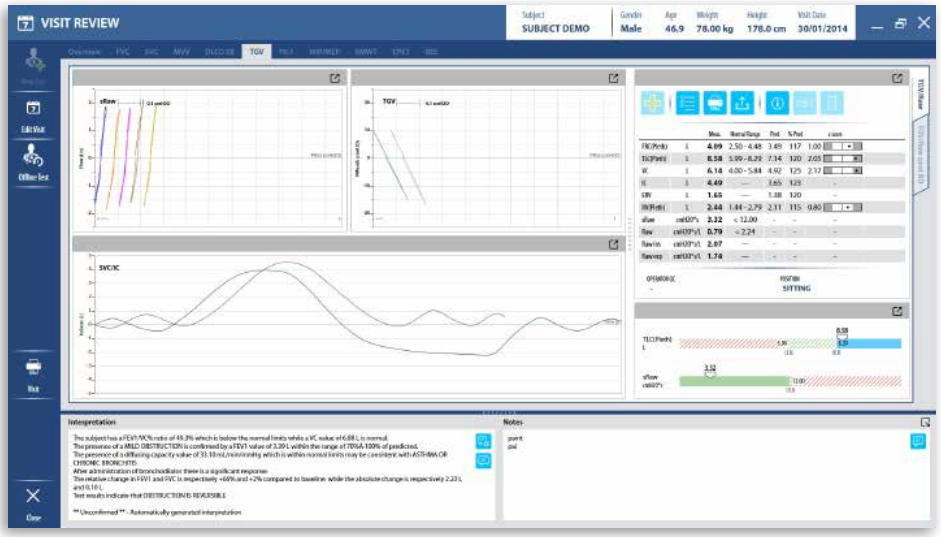
- Large constant-volume cabin.
- Quick calibration and fast stabilization times.
- Advanced quick release arm mechanism for one-hand height adjustment.
- Adjustable breathing valve connection for optimal patient comfort during testing.
- Simulate TGV test with open door to coach patient's compliance.
- Integrated, transparent compensation box for external pressure interferences.
- User-defined testing sequence (TGV, sRAW, SVC, IC).
- Real time review on all performed TGV and RAW captures.
- Polytropic factor calibration and body box leakage check for optimal performances.
- Automatic interpretation statements according to measured TLC.
- sRAW measurements during quite breathing (Thermal Drift Compensated)
- Possibility to capture multiple RAWs with one single click.
- Possibility to calculate TLC by using an Inspiratory Capacity or a complete Slow Vital Capacity manoeuvre.
- In-vitro Accuracy verification by a simulated test performed with optional Erlenmeyer Flask.

Lung Diffusing Capacity (DLCO)

The DLCO module allows the measurement of diffusing capacity of Carbon Monoxide in the lungs with different techniques. The measurement is performed through the continuous analysis of CO and CH_4 (tracer) fractions with fast analyzers.

- Dedicated CO analyzer designed for DLCO independent from $FeCO_2$.
- "0 wet" correction to compensate CO back-pressure and humidity interference.
- Advanced editing (automatic and custom selection of washout and alveolar gas volume).
- Alveolar Volume calculation by Mass Balance Technique (2017 ATS/ERS DLCO Guidelines)
- Mouth pressure signal during testing for real time quality control.
- Estimated TLC during DLCO, corrected for obstructive patients.
- Membrane Diffusion automatically enabled if multiple $DLCO_{sb}$ or $DLCO_{ib}$ manoeuvres are performed.
- Coach subjects before testing without using gas mixture.
- Both automatic and user-defined DLCO quality control grading.
- Breath-hold time settings according to various standards (Jones, Ogilvie, ESP).

Lung Diffusing Capacity and Body plethysmography results



Lung Volumes (FRC - Nitrogen Washout)

The lung volumes module adds the possibility to test Functional Residual Capacity (FRC) via single or multi-breath Nitrogen Wash-Out.

- Use of fast and accurate O_2 and CO_2 analyzers.
- Real time N_2 Wash-Out plot together with several indicators for the control of the respiratory pattern.
- Automatic detection of washout curve phases (N_2WO Single Breath).
- Automatic and Manual detection of the 4 phases composing the wash-out curve, including the slope of the alveolar plateau.
- Lung Clearance Index (LCI)
- Adjustable end test criteria in case of leaks occurred during testing (N_2WO Multi-Breath).

Forced Oscillation Technique

The Forced Oscillation Technique module is a system for the measurement of the mechanical properties of the respiratory system under tidal breathing conditions.

- Total Respiratory Impedance measurement by Pseudo Random Noise Signal
- Quick and easy assessment during normal brathing
- Ideal for uncooperative patients such as children or elderly people.
- Recognized reference method for pre-school children assessment

Airway Resistance (Rocc)

The Occlusion Technique (Rocc) is fast and reliable, more suitable for airway resistance measurement in patients unable to perform body plethysmography (critically ill, children). The patient will be asked to breathe spontaneously through a mouthpiece while an occlusion valve interrupts the airflow for a fraction of time.

- Hardware consists of a special handle incorporating a dedicated low flow PNT and an occlusion valve.
- Possibility to measure Occlusion Resistance pre and post BD (after bronchodilator administration).

Forced Oscillation Technique module

Integrated Dosimeter

The optional dosimeter module includes all hardware and software components to run a broncho challenge test by means of an integrated dosimeter.

- Automatic control of bronchial challenge tests through an integrated dosimeter.
- Automatic measurement of the actuation time of the dosimeter valve with high time resolution.
- Default set of testing protocols
- Broncho challenge protocols editor to easily create your custom testing protocol.
- Dedicated nebulizer arm support for increased usability.

Integrated Dosimeter

Respiratory Mechanics

Available as standard testing feature or as an optional feature, according to user configuration. The respiratory mechanics module includes:

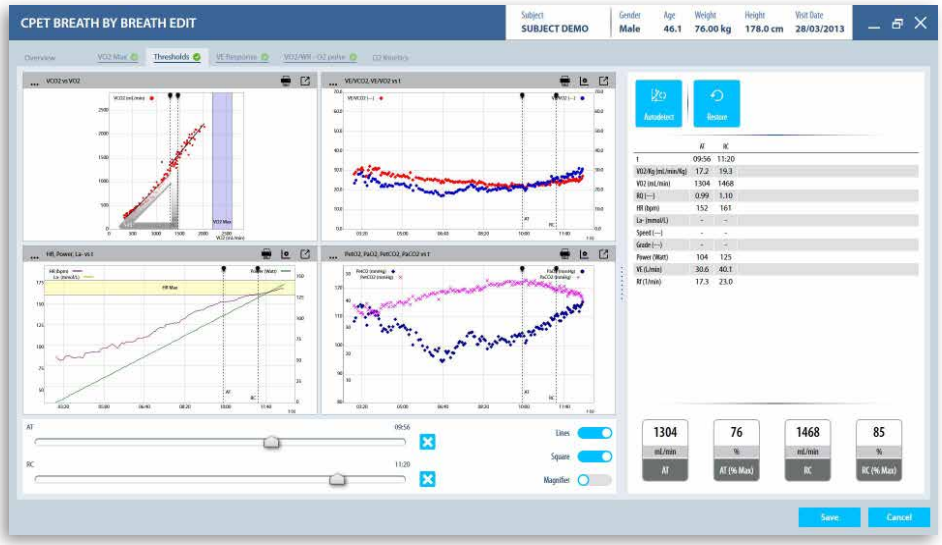
- Maximal Inspiratory Pressure (MIP) and Maximal Expiratory Pressure (MEP).
- Respiratory Drive assessment (P0.1), including measurement with enriched O2 or CO2 inspiratory mixture.

Multi-Breath Nitrogen Washout Test Results

Metabolic (CPET/REE)

Quark PFT can be transformed in a compact metabolic cart for the assessment of pulmonary gas exchange and ventilatory response during clinical exercise test. High quality components and super-fast analyzers ensure unsurpassed accuracy, reliability and real breath-by-breath analysis.

- Breath by Breath metabolic module for both Cardio Pulmonary Exercise Test (CPET) and Resting Energy Expenditure assessment.
- Ergonomic multi-use silicone face masks (available in 5 sizes).
- Possibility to upgrade the Metabolic module with additional Integrated diagnostic quality **12-lead Stress ECG**, either in wireless or patient cable configurations (optional).
- Independently validated for both exercise and resting applications.
- Data and graphs displayed through standard or custom defined Dashboards (9 panel plot, etc.).
- Comprehensive interpretation tool following latest standards.
- Exercise Flow-Volume loops (EFVL) for the evaluation of ventilatory limitation.
- Built-in, intuitive Protocols editor
- Access data in spreadsheet format for advanced data elaboration (filtering, smoothing, etc.).
- Manual or pre-set ergometer control allows smooth protocols and dynamic changes.



CPET Accessories and Options

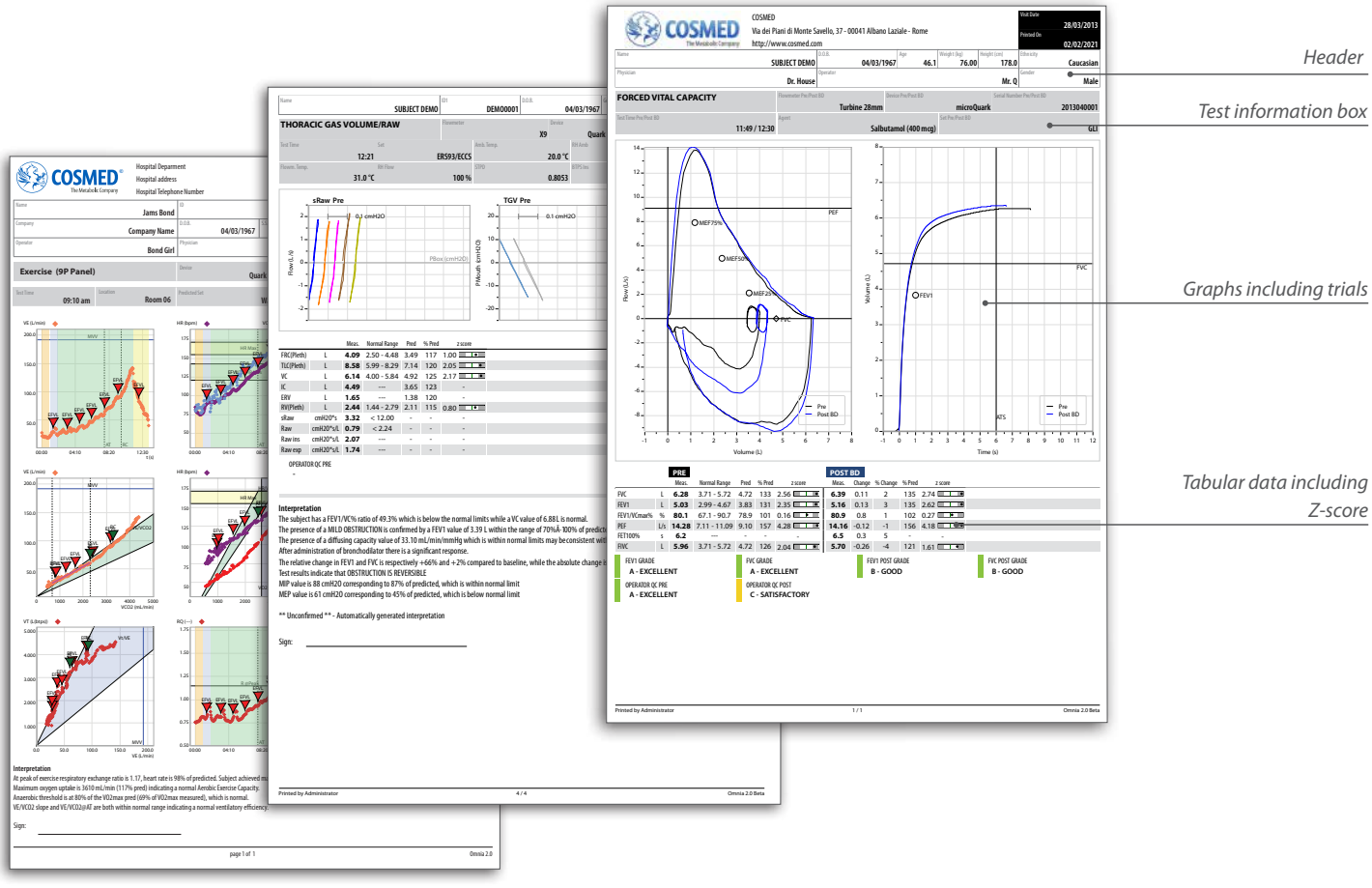
- **Mixing Chamber** for gas exchange analysis of low and high ventilation ranges.
- Integrated **Pulse Oximeter** monitors with a broad range of sensors (finger, earlobe or forehead).
- **Canopy Hood** for Gold Standard Resting Energy Expenditure (REE) measurements on spontaneously breathing subjects.
- Integration with **Blood Pressure** and **Cardiac Output** monitors
- **High FiO_2 kit** for gas exchange measurements using hypoxic and hyperoxic gas mixtures.
- **Wide selection of ergometers**, available from COSMED, including treadmills, cycle-ergometers, arm-ergometers and recumbent bikes, suitable for any clinical and research application.

Hardware Architecture

Quark PFT has been designed with a truly modular architecture that allows both easy upgrade and simplified service procedures. Each major component such as gas sensors or assembled electronics is manufactured in single boards that can be easily swapped by technical personnel provided with a minimal training on the Quark PFT technology.

Lung Function Testing	Quark PFT	Q-Box
Spirometry (FVC, SVC, MVV, Broncho Challenge)	●	●
Body Plethysmography (TGV, sRaw, sGaw, Pre/Post, Challenge)	○	●
Diffusing Lung Capacity (Single Breath, IntraBreath, Membrane Diffusion)	○	○
Lung Volumes (N2 Washout Multi-Breath, Closing Volume, LCI)	○	
Respiratory Mechanics (MIP/MEP, P0,1)	○	●
Forced Oscillation Technique (Rrs, Xrs, Ax)	○	○
Airway Resistance by Occlusion Technique (Rint/Rocc)	○	○
Integrated Dosimeter		
Metabolic Testing		
Cardio Pulmonary Exercise Testing (VO2max, Sub Max VO2, Anaerobic Threshold)	○	
12-Lead Stress Testing ECG	○	
Indirect Calorimetry (REE)	○	
High Altitude Simulation (Low FiO2 Kit)	○	
CPET Testing w/ Mixing Chamber	○	

● Standard ○ Optional



Custom printouts including pictograms, tabular data, QC information, charts and comprehensive interpretation statements.

Headquarters
ITALY

COSMED Srl
Rome
+39 06 931-5492
info@cosmed.com

GERMANY

COSMED Deutschland GmbH
Werneck
+49 (0)8684942900
DE@cosmed.com

FRANCE

COSMED France SASU
Brignais
+33 (0)4 478628053
FR@cosmed.com

THE NETHERLANDS

COSMED Benelux BV
Nieuwegein
+31 (0) 88 10 50 500
BNL@cosmed.com

DENMARK

COSMED Nordic ApS
Odense
+45 6595 9100
DK@cosmed.com

SWITZERLAND

COSMED Switzerland GmbH
Fehraltorf
+41 (0)43 50 869 83
CH@cosmed.com

USA

COSMED USA, Inc.
Concord, Chicago
+1 800 4263763 Toll Free
USA@cosmed.com

AUSTRALIA

COSMED Asia-Pacific Pty Ltd
Artarmon
+61 449 971 170
ANZ@cosmed.com

HONG KONG

COSMED HK Ltd
Kowloon
+852 3708 3126
HK@cosmed.com

COSMED

COSMED Srl

Via dei Piani di Monte Savello 37
Albano Laziale - Rome 00041
Italy
+39 (06) 931-5492 Phone
+39 (06) 931-4580 Fax

cosmed.com

Distributed by

To know more