# Quark RMR
Nutritional Assessment


The Most Accurate Indirect Calorimetry for Research and Clinical Practice provided in a compact/bed-side solution

- Indirect calorimetry (continuous $VO_2$, $VCO_2$)
- Accurate measurement Metabolism substrate (RQ, FAT, CHO, PRO)
- Provided with flow-based-dilution Canopy Hood & Disposable Face Masks
- Ethanol Burning Kit
- Either Spontaneously Breathing subjects or Mechanically Assisted patients
- ICU Kit for ventilated patients (option)

COSMED
Pulmonary Function Equipment

The assessment of the nutritional needs of critically ill patients is vital as overfeeding and negative energy balance can be detrimental to their health and recovery.

The Quark RMR is the latest innovation in Indirect Calorimetry designed to accurately and instantaneously measure patient's energy requirements and response to artificial nutrition during prolonged hospitalization or admission to the intensive care unit.

By measuring REE and providing the correct energy balance in critically ill patients, hospital may improve patient outcome, and decrease the length of hospitalization which will have a significant and immediate impact on the bottom line.

## Applications

The Quark RMR is an essential piece of equipment for:

- Research and Clinical Nutrition
- Critical Care & Nutrition Support
- Cancer centers, neurological and coma patients, burn patients, transplants patients
- Bariatric Centers

## Key features

- Indirect calorimetry $VO_2$, $VCO_2$, RQ, REE and related parameters
- Substrate utilization (%FAT, %CHO, %PRO).
- High $FiO_2$ kit for elevated $O_2$ levels (option) up to 60%
- Automatic quality control during test is provided by a random check on gas concentrations.

## Accurate Indirect Calorimetry

The Quark RMR uses latest technology in gas analyzers. It is provided with an Infrared (NDIR) $CO_2$ sensor and a fast-response, stable, durable and non-consumable Paramagnetic $O_2$ sensor. Both sensors are virtually maintenance free and reliable, even after many years of use.

## Ease of use & immediate results

Executing a test with the Quark RMR is simple; you can choose the length of the protocol, and monitor breath by breath data during the entire test. Features of our user-friendly software:

- Users can set-up their own work-space (choosing parameters, graphs and icons to display).
- Automatic steady state calculation based on user defined criteria.
- Calculate REE by selecting any time interval during a test.
- Calculate NPRQ by manually individual Ureic Nitrogen level.

## High Versatility

Tests can be carried out in three different options:

### 1 - Canopy Hood

Quark RMR comes with a flow-dilution-based hood for spontaneous breathing patients. Not requiring conventional mouthpiece or mask, it allows measurement with improved patient comfort. No need to distinguish between inspiration and expiration, flow rate is directly measured with digital turbine flowmeter. Ventilatory rate is regulated by the Quark.

### 2 - Ventilator

Quark RMR can be optionally integrated with a ventilator through its exhalation port for Intensive Care Unit (ICU) applications. This breath by breath sampling method allows RMR assessment of mechanically assisted patients connected to the ventilator by a tracheal filter. The ICU kit also allows detection of bias flow rate together with calibration of analysers and flowmeter. Inspiration and expiration are identified on concentration of CO2 expired.

### 3 - Face mask

A simpler and not expensive breath by breath analysis through Quark RMR with disposable face masks. Real time measurement of the volume of air ventilated by the patient (flowmeter at the mouth). Not common in clinical and research, but still valid alternative for weight management measurements.

*Resting Energy Expenditure with Canopy hood.*

*The Disposable/single use face mask*

*Quark RMR can measure REE in mechanically assisted patients by a connection to the exhalation port of a ventilator (optional software required)..*

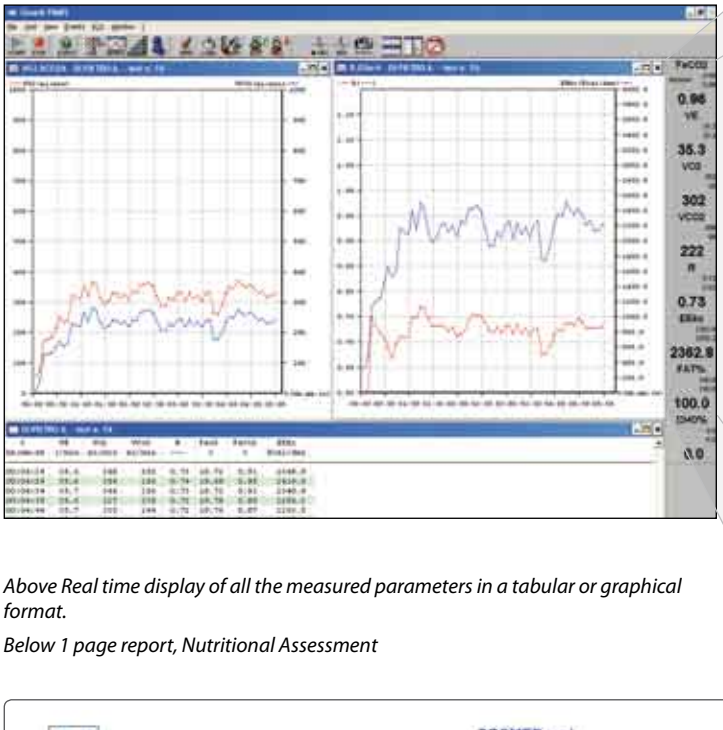
## Ultimate Software

The software is designed for Windows XP and compatible with VISTA. User-friendly interface, intuitive commands and icons are the perfect tools for fast and reliable data collection and interpretation in any hospital department or doctor's office.

- Complete patient archive, diagnosis database and custom reports.
- Automatic generation of PDF files with user-defined file names.
- Batch printing of multiple reports.
- Runs in network environments compatible with any MS protocol.

## Options / Accessories

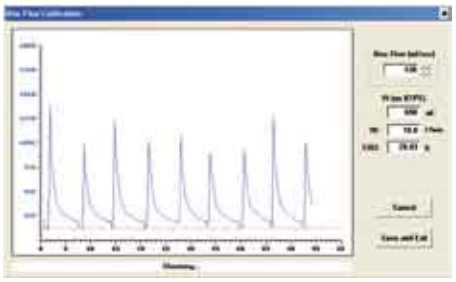
| | |
|---|---|
| Ventilator Kit | Ventilator Option (integrating with ventilators through their exhalation port). |
| Ethanol Burning kit | Very accurate quality control test for routine calibration of ventilatory rate. It consists of the measurement of the total CO2 production by burning a known quantity of Ethanol. If system is accurate, the RQ Measurement is expected to range from 0.64-0.69 |
| Gas Mixture | Calibration cylinders of different concentrations and sizes. |
| Silicon Face Masks | Reusable facial mask with ergonomic head-cap (5 sizes available). |
| Medical Cart | Medical Graded cart compact and easy to transport for bed-side applications. |
| High/low $FiO_2$ Kit | For Elevated $O_2$ level applications. |
| Single patient Use Face Mask | Disposable Face Mask (patent) with integrated bacterial filter eliminates risk of cross contamination. |



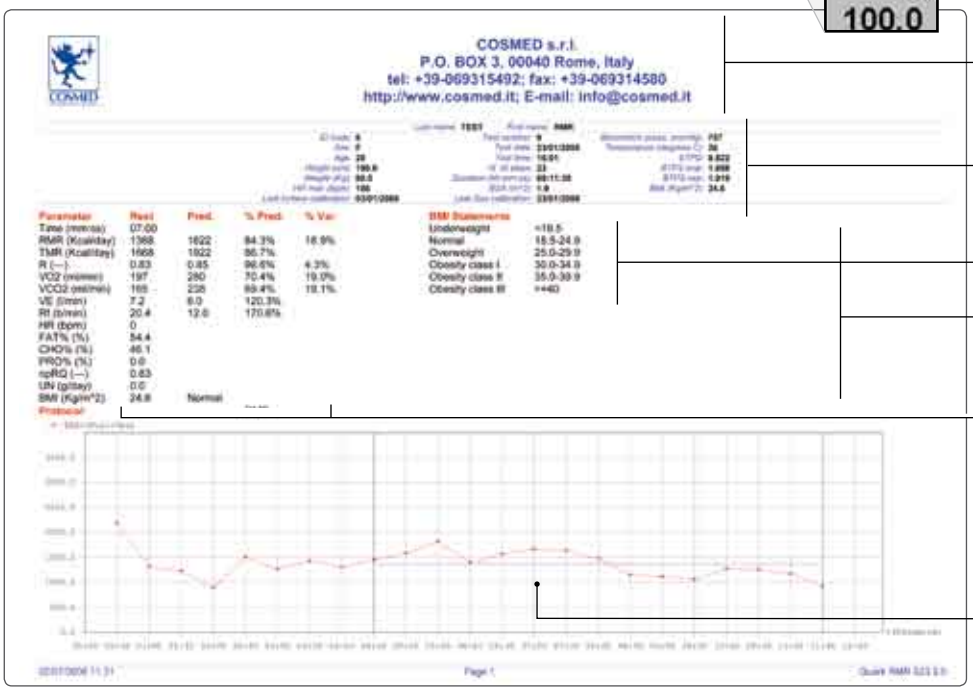

*Above Real time display of all the measured parameters in a tabular or graphical format.*

*Below 1 page report, Nutritional Assessment*

*Ethanol Burning Kit*



*Bias Flow Calibration*




*Header (user defined)*

*Patient information*

*BMI management*

*List of main parameters*

*% of variation for each parameter during the selected steady state*

*User defined steady state selection*

*Optional medical grade cart for comfortable bed-side application.*

## Investment Protection

COSMED has done everything to protect customer's investment by keeping operating costs as low as possible. The product's was designed to eliminate ordinary maintenance and make trouble-shooting as easy as possible. Free software upgrades for the first 12 months to keep you up to date with the latest scientific guidelines.

*Ventilator and Plugs are easily reachable on the back of the Quark RMR*

# Technical Specification

| Tests | Unit |
|---|---|
| *Resting Energy Expenditure (REE, RMR)* | ● |
| *Indirect Calorimetry (VO2, VCO2, RQ)* | ● |
| *Indirect Calorimetry w/Canopy Hood* | ● |
| *Indirect Calorimetry w/Ventilator (ICU)* | ○ |
| *Physical Mixing Chamber* | ○ |
| *HR Interface w/ external ECG (TTL)* | ● |

| Analyzers | Oxygen ($O_2$) | Carbon dioxide ($CO_2$) |
|---|---|---|
| *Type* | *Paramagnetic* | *NDIR* |
| *Range* | *0-100 %* | *0-10 %* |
| *Accuracy* | *± 0.03%* | *± 0.03%* |
| *Response time* | *<120ms* | *<120 ms* |
| *Warm-up time* | *0 min* | *5 min* |

### Flowmeter

| | |
|---|---|
| *Type* | *Bi-directional digital turbine (Ø 18 mm)* |
| *Range* | *0-50l/min* |
| *Accuracy* | *±2%* |
| *Resistance* | *<0.7 cmH2O/l/sec @ 3 l/sec* |

### Hardware

| | |
|---|---|
| *Dimensions & weight (Quark RMR unit)* | *17 x 30 x 45 cm/8 Kg* |
| *Dimensions & weight (Canopy)* | *32 x 50 x 30 cm/0.6 Kg* |

### Standard Packaging Includes

*Quark RMR unit, Canopy, 2 Resting Flowmeter, RMR disposable masks, antibacterial filters, PC software RMR, calibration syringe, Polar® HR monitor (receiver and transmitter), power supply cable, USB cable, user manual*

### Available languages

*Italian, English, French, Spanish and German*

### Electrical requirements

| | |
|---|---|
| *Voltage* | *110-240V ±10%; 50/60Hz* |
| *Internal emergency battery* | *12V; 1,2 Ah* |

### PC configuration required

*PC Pentium or higher, Windows XP, 64 Mb RAM, USb or RS 232 , CD reader, 20 Mb space free on HD, Monitor VGA, SVGA, XGA*

### Safety and Quality Standards

*Quark RMR is in compliance with the European Directive 93/42/CEE concerning medical devices.*
*Equipment complies with FDA 510 (k)*

CE 0476

CERMET SISTEMA DI GESTIONE CERTIFICATO Reg.n. 387- M UNI EN ISO 13485:2003

CERMET SISTEMA DI GESTIONE CERTIFICATO Reg.n. 387- A UNI EN ISO 9001:2008

COSMED Pulmonary Function Equipment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