Introducing The New Generation of Metabolic Monitors for Indirect Calorimetry in Clinical Practice
Introduced by COSMED, worldwide leader in the design of metabolic systems for clinical and human performance applications, Q-NRG is the first Indirect Calorimeter specifically intended for the measurement of Resting Energy Expenditure (REE) in patients who are mechanically ventilated or spontaneously breathing and for healthy subjects. Indirect calorimetry remains the Gold Standard in measuring energy expenditure in clinical settings, proven to have enormous advantages compared to Predictive Equations\(^1\). In fact, this measuring technology provides an individual and dynamic metabolic assessment based on the actual physical status of the subject rather than estimating it on anthropometric data.

Q-NRG is a unique product, the result of COSMED’s collaboration with world-class institutes in the field of Clinical Nutrition. Product concept and specifications have been designed together with the ICALIC Trial study group\(^2\). This collaboration made possible the development of an accurate metabolic system simple to use and at the same time able to solve all typical pitfalls of Indirect Calorimetry technology.

**Individual metabolic assessment**
Q-NRG uses the Gold Standard Indirect Calorimetry technique to measure metabolic parameters. The technique itself guarantees that the results reflect each individual’s specific and existing characteristics\(^3\). Therefore, QNRG is the ultimate tool for research in metabolic response at resting, to develop individual weight management programs and optimize energy balance.

**Designed for Clinical Practice**
Q-NRG usability has been designed according to best clinical practice. An intuitive workflow supports the user through all operations with main instructions prompted along the procedures and test information always accessible. Designed to be portable, the device can be easily transported between rooms.

**Latest Technologies in a Compact Device**
Q-NRG is a compact, lightweight, battery operating device. The 10” inches LCD touch-screen simplify access to all operations. Bluetooth, USB, RS-232 and LAN interfaces allow to connect the system to any hub (PC, printers, etc.).

**Affordable**
Q-NRG has been designed to compete with conventional metabolic system, at a fraction of the cost.
**One tool for many applications**

Q-NRG provides flexibility in a variety of clinical settings, assessing different patient’s conditions and with different techniques (Canopy Hood and/or Face Mask), from pediatric to adult.

### Canopy Mode
Indirect Calorimetry through Canopy Hood is the “Gold Standard” technique to measure REE in spontaneously breathing subjects. Patient’s exhaled gases are diluted with a known airflow within a “Canopy Hood” (available in small and large size). Measurement of dilution flow and O₂/CO₂ concentrations allow the calculation of VO₂ and VCO₂. Each test utilizes a single-use veil and an anti-bacterial filter.

### Face Mask Mode
REE measurements can be performed using an oronasal face mask on spontaneously breathing subjects whenever Canopy Hood cannot be used (special subjects, claustrophobic, etc.). The face mask (available in 5 sizes) is placed on the subject and fixed with a comfortable headcap. A turbine flowmeter is connected to the face mask to measure ventilatory parameters and a sampling line is used for the measurement of inspiratory and expiratory O₂/CO₂ concentration.

### Accessories & Options
- **Canopy Hood kit.** Available in two sizes (Large or Small), includes hood w/ adapter and corrugated tube.
- **Face Mask kit.** Includes two oronasal masks in silicone (S/M sizes), 1 head cap, and external flowmeter.
- **Gas Calibration kit.** Required for the monthly gas calibration. It includes a 3,6 Liter cylinder with certified gas mix (16% O₂, 5% CO₂, N₂ bal) and pressure regulator.
- **Flow/Volume Calibration kit.** Required for the monthly calibration, includes a 3L certified calibration syringe and adapters.
- **Clamp.** Pole/rail clamp with 100 mm VESA mounting plate to be used for securing Q-NRG on any Pole or Rail within a hospital setting.

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**Canopy Hood (small or large size) utilizes a single-use veil to avoid cross contamination**

**Canopy tests require a simple set-up by connecting the canopy hose to the blower**

**Multi-use silicone oronasal face masks are available in 5 different sizes (adult and pediatric)**

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**Real Time dashboard of Canopy test shows metabolic and ventilatory data as well as widgets to verify Quality Control and understand whenever test is completed.**

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**Indirect Calorimetry Report - Canopy Test**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Weight</th>
<th>Height</th>
<th>VO₂</th>
<th>VCO₂</th>
<th>FEV</th>
<th>RQ</th>
<th>REE</th>
<th>Kcal/day</th>
<th>Variability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maria Ross</td>
<td>102 Kg</td>
<td>195 cm</td>
<td>226 mL/min</td>
<td>199 mL/min</td>
<td>15 L/min</td>
<td>0.88</td>
<td>1581</td>
<td>27.1</td>
<td>3.8</td>
</tr>
</tbody>
</table>

**PDF printout of Canopy test shows test results in a comprehensive format to facilitate metabolic assessment. Tabular data may also be included.**
To know more:

Bibliography


More scientific studies on www.cosmed.com/bibliography

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Technical Specifications

Product
Part Number C09092-01-99
Intended use Resting Energy Expenditure (REE) measurement on spontaneously breathing subjects
Standard packaging Q-NRG, Canopy Hood with hose, USB cable, power cable, User Manual
Test Kit (Single-use) Canopy Veil, Anti-bacterial Filter

Measurement Modes
Canopy Hood Standard
Face Mask Option

Main Parameters Range Accuracy
VO2 10-1000 mL/min ±3% or 5mL/min
VCO2 10-1000 mL/min ±3% or 5mL/min
RQ 0-2.00 ±5% or 0.04
REE 0-7200 kcal/day ±5% or 36 kcal/day

Flowmeter Canopy/Mask
Type Bidirectional digital turbine
Flow Range 0.05 - 2 L/s
Accuracy ≤ 2% or 100mL/min @1-25 L/min
Resistance <0.25 cmH2O s/L @ 1 L/s
Calibration With 3L calibration syringe (monthly)

Gas Sensors

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>O2</td>
<td>0-75%</td>
<td>0-10%</td>
</tr>
<tr>
<td>CO2</td>
<td>&lt;0.05% Vol</td>
<td>&lt;0.05% Vol</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.01% Vol</td>
<td>0.01% Vol</td>
</tr>
</tbody>
</table>

Gas exchange sampling Micro Dynamic Mixing Chamber (patented)

Gas Sensors

- **O2**: Type Galvanic Fuel Cell (GFC), Range 0-75%, Accuracy <0.05% Vol, Resolution 0.01% Vol, Calibration Automatic via gas cylinder (monthly)
- **CO2**: Gas exchange sampling Micro Dynamic Mixing Chamber (patented), Type Galvanic Fuel Cell (GFC), Range 0-75%, Accuracy <0.05% Vol, Resolution 0.01% Vol, Calibration Automatic via gas cylinder (monthly)

Report
Export modes USB or wireless (to optional software)
Export formats PDF, CSV, XML (proprietary)

Hardware
Display 10.1” Transmissive TFT LCD, 1024x600, 65k colors, capacitive touch screen
Power Battery: Li-Ion “smart” (3 hours autonomy)
Main: 100V-240V ±10%; 50/60Hz, 1.5A @100VAC, 1.0A @240VAC
Wireless Connectivity Bluetooth (2.1 + EDR Class II - Range 10 m line-of-sight)
Wired Connectivity 1 USB-device (5kV galvanic-insulated), 2 x USB Host, RS-232, LAN
Weight & Dimensions 4.65 kg (10.3lb), 31x21x27cm (12.2x8.3x10.6in)
Environmental ranges Temp. +10°C to +35°C. Humidity: 5-93% (non condensing). Atmospheric pressure: up to 3011m

OEMIA Languages
Italian, English, Spanish, French, German, Portuguese, Greek, Dutch, Turkish, Russian, Chinese (Traditional & Simplified), Korean, Romanian, Polish, Czech, Norwegian, Hebrew

OS Requirements Windows 7, 8, 10

Security & Quality Standards
MDD (93/42/EEC Class IIA), Safety (Class I IEC 60601-1), EMC (IEC 60601-1-2), Telemetry (ETSI EN 301 489-17)

* This device is intended for the measurement of REE with some limitations in accordance with labeling, within the following population:
  - Canopy: spontaneously breathing subjects >15Kg (33lb)
  - Mask: spontaneously breathing subjects > age 6 and 10Kg (22lb)

Q-NRG can be mounted either on the optional cart (with cylinder holder and accessory basket) or on any hospital rail, thanks to the optional clamp with VESA mount plate

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