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## Quark CPET

### Breath by Breath

#### Validation of the COSMED Quark CPET Respiratory gas analyser in the BBB mode

*Third party validation by Lennart Gullstrand, Thomas Lindberg and Juan Alonso. 2013 Elite Sport Centre, Bosön, Swedish Sports Confederation, Lidingö, Sweden*

**METHODOLOGY:** The study included 9 well trained athletes with a VO<sub>2</sub> peak around 5 L·min<sup>-1</sup> and high VE exercising at well controlled submaximal steady state conditions and at work rates leading to exhaustion. The reference measurement method used was the Douglas bag method (DB).

**CONCLUSIONS:** Despite some differences between the Quark CPET in the BxB mode and the DB reference method this device is most interesting in many aspects. The validation results are in the range of other similar BxB devices.

#### Validation versus "First Principles" Metabolic Calibrator.

*Third party validation by Australian Institute of Sport (AIS) 2010.*

**METHODOLOGY:** The 'first principles' metabolic calibrator is capable of delivering precise cyclic air flows of known tidal volume, frequency and gas makeup. "First principles" systems are advantageous in validation testing because their calibration is based solely on easily measured and verified quantities such as length and time. See: Gore CJ, Catcheside PG, French SN, Bennett JM, Laforgia J. Automated VO<sub>2</sub>max calibrator for open circuit indirect calorimetry systems. *Med Sci Sports Exerc* 1997; 29(8):1095-1103.

**CONCLUSIONS:** The results of the test indicate that overall, the COSMED Quark CPET Metabolic Cart appears to be accurate for assessment of the metabolic rate of athletes during exercise.

### Useful Links

COSMED Homepage

<http://www.cosmed.com>

### Mixing Chamber

#### Validity of COSMED's quark CPET mixing chamber system in evaluating energy metabolism during aerobic exercise in healthy male adults.

*Nieman DC, Austin MD, Dew D, Utter AC. Res Sports Med. 2013;21(2):136-45. doi: 10.1080/15438627.2012.757227.*

**PURPOSE:** This study validated the accuracy of COSMED's Quark cardiopulmonary exercise testing (CPET) metabolic mixing chamber system in measuring metabolic factors during maximal, graded exercise testing.

**METHODOLOGY:** Subjects included 32 physically active men between the ages of 18 and 34 years. During the first test session, subjects were measured for maximal oxygen consumption twice (15 min separation) with the CPET and Douglas bag systems (random order). During the second test session, subjects exercised through four stages of the Bruce treadmill protocol with measurement by the CPET and Douglas bag systems (random order) during steady state at the end of each 3-minute stage.

**RESULTS:** Statistical analysis using a 2 (systems) x 5 (time) repeated measures ANOVA showed that the pattern of change in VO<sub>2</sub>, VCO<sub>2</sub>, VE, FeO<sub>2</sub>, FeCO<sub>2</sub>, and RER did not differ significantly between CPET and Douglas bag systems.

**CONCLUSIONS:** This validation study indicates that the CPET mixing chamber system provides valid metabolic measurements that compare closely with the Douglas bag system during aerobic exercise.

#### Validation of the Cosmed Quark CPET Respiratory gas analyser

*Third party validation by Lennart Gullstrand, Thomas Lindberg and Juan Alonso. 2013 Elite Sport Centre, Bosön, Swedish Sports Confederation, Lidingö, Sweden*

**METHODOLOGY:** The study included 10 well trained athletes with a VO<sub>2</sub> max ≥ 5 L·min<sup>-1</sup> and high VE max exercising at well controlled submaximal steady state conditions and at work rates leading to exhaustion. The reference measurement method used was the Douglas bag method (DB).

**CONCLUSIONS:** Despite differences in VE and some other differences the validation results this device is most interesting in many aspects. For use in the Sports medicine area the 7 L volume mixing chamber will probably match any big and well trained endurance athlete with exceptional tidal volumes (> 5 L).