CORTEX Biophysik GmbH

With our two main product lines, METALYZER® and METAMAX®, we are pioneers in the field of medicine, sport and fitness. We achieve maximum performance in cardiopulmonary exercise testing with innovative hardware and software.

Our solutions for cardiopulmonary exercise testing are applied worldwide, ranging from basic research to routine cardiac diagnosis, from competitive sport to fitness centers. Physicians, therapists and coaches successfully use our systems in the fields of sports medicine, cardiology, pulmonology and occupational and rehabilitation medicine, as well as in exercise and sports science. CORTEX also stands for competence in extreme situations and high-level requirements, which has been demonstrated by our participation in the largest Everest medical expedition to date, the »Xtreme Everest« project (2007), and our involvement in many Olympic training centers.

Development, production and administration are located at our head office in Leipzig, Germany. From there we distribute our solutions for cardiopulmonary diagnostics to all continents via a worldwide network of local sales and service partners. All our products are CE certified and meet European standards for Quality and Safety. In your area – our sales and service partners are competent and authorized. For us, competence in cardiopulmonary exercise testing means constant technical innovation and close partnership – aspects you can rely on with CORTEX.

The major products of CORTEX Biophysik

METALYZER® 3B

Small, compact, yet highly sophisticated cardiopulmonary exercise system using breath-by-breath / intra-breath technology for a precise functional assessment (cardiac, pulmonary) during bike or treadmill exercise.

Accurate, reliable measurement results due to fast-response precision analyzers. Highly suitable for a broad ventilation range (patient - athlete). Automatic control of commonly used bikes or treadmills using standardized or user-specific workload protocols fully integrated.

Easy-to-expand via optional hardware (e.g. 12-Channel ECG, NIBP, SpO2) and software (e.g. CORTEX Spirometry, CORTEX Energy Metabolism, CORTEX Cardiac Output) to a sophisticated diagnostic workstation.

Quick access of test results, comparisons and simple report generation using powerful MetaSoft® with automatic assistant to track therapeutic or training progress.
**META**

The **META** sets new standards in cardiopulmonary exercise testing. Its lightweight (570g) design makes it a truly “allround” tool to perform reliable breath-by-breath and intra-breath measurements virtually anywhere inside and outside the stress lab and for a broad ventilation range.

In fine the **META** is a mobile, mains independent indoor and outdoor cardiopulmonary exercise testing system for sports and exercise science as well as for occupational medicine.

The battery-operated **META** is integrated into a “scarf” or “scarf jacket” made of soft, breathable material.

As a result, it is comfortably worn around the shoulder. Equipped with an intelligent bidirectional telemetry, the **META** can be operated and all tests be safely monitored from a remote PC. A built-in speech output facilitates field operation and provides for a safe remote patient control throughout the test.

Key operator functionalities, such as battery, data logger, telemetry and a 3-channel monitoring ECG, are built into the base system, reducing external cable and tube connections to a minimum. The mains-independent of an operation is up to 15 hours and the wireless range is up to 1,0 km.

Testing is getting more comfortable and efficient, ensuring true plug in play operator comfort. As a modular system, the **META** is easy to expand to a sophisticated diagnostic workstation via a broad range of application-specific hardware (e.g. 12-Channel ECG, NIBP, SpO2) and software (e.g. CORTEX Energy Metabolism, CORTEX Training Guidance, CORTEX Spirometry) options. In 2001, it was awarded with the internationally renowned if Product Design Award.
CORTEX Biophysik GmbH

CORTEX MetaSoft®

The basis of the CORTEX systems in the medical and sports area is the MetaSoft® software. It perfectly meets the requirements of practice-oriented, powerful cardiopulmonary exercise testing – quickly learnable, intuitive to operate.

Individual user profiles ease the work flow. Modular software expansions increase the flexibility of the system. The workload profiles can be optimally adapted to any patient.

The software MetaSoft® reliably controls all peripheral devices or systems, in example blood pressure measuring devices, ergometers and further workload devices.

Parallel to the basic values, the software determines further parameters such as oxygen uptake, oxygen uptake kinetics as well as ventilatory thresholds. The tracings of the 12-channel ECG are continuously displayed and can be saved as desired.

Clearly laid out graphical user interfaces assist you while evaluating the results. Innovative cardiopulmonary exercise testing software must be simple.

Software options

STATERA®

Patients with an unknown cardiovascular risk can be jeopardized when subject to a maximum exercise load. For this patient group we have developed STATERA® – our expert system for risk assessment and treatment evaluation in patients with heart disease.

Even with low exercise loads and short exercise times you will obtain clinically relevant feedback with STATERA®.

STATERA® uses a sub maximal metabolic exercise test to determine selected risk-predictive exercise parameters for left ventricular function and sympathetic activity. Laboratory values such as BMP and CRP and other relevant information can be included here. Based on scientific studies, the STATERA® risk parameters are proven predictors of cardiovascular risk. Meaningful trend and comparison graphs allow you to monitor the changes obtained with a given therapy.

Our software fulfils your most important requirement in testing cardiac risk patients: the acquisition of clinically relevant data without exposing the patient to unnecessary risks.
The path from measurement to report can be very simple, even if a large number of different individual values and curves need to be interpreted. The CORTEX Interpretation Assistant guides you rapidly, securely and simply to a meaningful individual report.

Clearly structured, interactive decision trees based on K. Wasserman’s interpretation flowchart approach help you to evaluate the parameters measured. A definite diagnosis is obtained in the blink of an eye. Physiologic reasoning underlies each step in the decision.

The suggested decision paths and diagnosis texts can be customized at any time. You can choose between a short or long report form, with or without a complete decision path and with supplementary physiologic explanations.

Your patients appreciate a short waiting time between testing and discussion of the diagnosis. With the innovative software tools from CORTEX you gain more time in differential diagnosis and performance testing.

A number of heart diseases cause changes in heart rate and in left and right ventricular stroke volume. These changes become particularly marked on exercise. Our cardiopulmonary exercise testing systems allow the continuous, noninvasive recording of cardiac output based on the maximum and real-time oxygen uptake (K. Wasserman’s method). Therefore, even during cardiopulmonary exercise testing you are obtaining indicators of cardiac changes.

Our CORTEX Cardiac Output software option supplements MetaSoft® with the continuous determination and display of cardiac output and offers a safe and permanent indicator of heart function for both healthy subjects and cardiac patients.
**CORTEX Energy Metabolism**

Optimized fat metabolism through individually adapted training is crucial for successful weight reduction. Focused and stress-free weight loss is only possible if you know your energy balance at rest and during exercise. The CORTEX Energy Metabolism software for MetaSoft® helps you to optimize your patients’ weight control individually.

With each CORTEX cardiopulmonary exercise testing system you can measure energy metabolism and substrate consumption at rest and during exercise. The methodological basis of this procedure is indirect calorimetry.

A number of parameters, such as gross efficiency and percentage substrate consumption, supplement your analysis. This allows you to determine the maximum fat burning range individually. The results can be compared with normal values and presented in terms of body measurements.

Using the CORTEX Energy Metabolism module, you can create clearly written reports as a basis for individual diet or training recommendations. And, in conjunction with our portable META MAX® 3B system, you can determine energy metabolism directly during training or in a work environment.

As a physician you are required now more than ever to provide competent advice. Our software options make this task easier for you.

**CORTEX Spirometry**

All our solutions for cardiopulmonary exercise testing naturally offer the option of conventional spirometry. You therefore receive our CORTEX Spirometry software option, which operates within the MetaSoft® functional environment and offers you a number of other measurement, calculation and comparison options in addition to VC, FVC and MVV tests.

With minimal additional effort you can offer your patients a lung function test at any time under laboratory conditions with CORTEX Spirometry.
The CORTEX Training Assistant software option for MetaSoft® offers you reliable support in determining optimal training and documented progress. In more than 20 years of cooperation with colleges, universities and Olympic training centers, we have built up an extensive database.

Using this database, the software module evaluates the individual performance and determines the training zones on the basis of a well-established methodology. Key indicators of cardiopulmonary exercise testing such as Watt/kg, \( \text{VO}_2\text{max} \), \( \text{VO}_2\text{/kg} \), HR, \( \text{VO}_2\text{/HR} \), AT and body mass index (BMI) are included.

Five individualized, scientifically based heart rate training zones are determined automatically for different exercise phases. Training progress can be easily monitored and documented; to be achieved goals can be seen.

Convert the results of the CORTEX Training Assistant simply and rapidly into a specific training plan. Simply set the parameters such as target, frequency and training equipment and generate a weekly and global training plan. With sport-specific, individual training zones it is easier for clients to organize their training themselves. And you improve their compliance with the training plan and make it easier for you to monitor the results.
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CORTEX AIRCHECK

With CORTEX AIRCHECK, you are investing in to the fitness market of the future; competent analysis is the key to an improved exercising outcome and efficient customer retention.

Our complete system for gas exchange analysis allows you to perform metabolic exercise tests requiring minimum floor space and a low investment.

The superior technology of the CORTEX AIRCHECK has its roots from the field of medicine and competitive sports. It was specifically adapted to meet the requirements for the application in health, fitness and athletic clubs.

The AirCheck Software

With the AirCheck Software you do precise testing for discerning clients. The CORTEX AIRCHECK makes it easy for you to testing with the Software options: The maximum exercise testing for the energetic, fat metabolism testing for beginners and for weight reduction and the resting metabolic rate testing for using indirect calorimetry.
Software options

**Maximum exercise testing**

With a maximum exercise test you will be able to approach top-performance-oriented and health-conscious clients. The AirCheck software allows you to exactly determine the personalized heart rate zones for optimal exercising. The foundation for this approach is the analysis of the exercise-dependent oxygen consumption and the determination of the anaerobic threshold. Top-performance-oriented and health-oriented exercise schedules can then be developed on the basis of these results.

**Fat metabolism testing**

An effective, personalized fat burning exercise schedule simplifies the monitoring of weight reduction and is based on the metabolism of fats and carbohydrates under progressive increasing physical exercise. The heart rate zone for optimum fat burning is determined individually. Two target groups can be approached with this test: the beginner that wants to specifically exercise in the basic zone and the obese individual that wants to reduce weight by specifically exercising in the efficient fat burning zone.

**Resting metabolic rate testing**

The resting metabolic rate provides information on the energy balance of your client. For this, energy metabolism at rest is measured as the basis for a controlled calorie intake regime. This allows you to establish a nutrition plan for your client to achieve a continuous optimal weight.
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**CORTEX Biophysik GmbH**

**CORTEX Solutions for Lab and Field Testing**
Extend your System and your Performance

The Hardware extensions and complete systems from CORTEX

Complete measurement set

This will provide you with everything. METALYZER® 3B cardiopulmonary exercise testing system including accessories, 12-channel PC-ECG with electrode suction system, bicycle ergometer, PC system with two monitors and printer, CORTEX mobile system cart and MetaSoft® software.

Workload devices

CORTEX will offer you many current available workload devices from well-known manufacturers. We would be happy to provide you with further details.

CORTEX mobile system cart

Remain mobile - CORTEX mobile system cart can carry the METALYZER®, PC, printer, 2 monitors, ECG and ECG electrode suction system, and blood pressure device. Move your complete cardiopulmonary exercise testing system effortlessly to wherever you need it.
**Ipod® and Xpod®**

Simple and flexible pulse oximetry

**Ipod®:** External digital system with finger clip sensor.

**Xpod®:** Like Ipod, but with selectable application-specific sensors.

With their compact size, Ipod® and Xpod® are particularly suitable for mobile use with METAMAX®.

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**Cardiopulmonary exercise testing and ECG**

For cardiopulmonary exercise testing, most available ECG systems can be interfaced to the CORTEX systems.

Moreover, CORTEX offers 12-channel ECG systems from well-known manufacturers.

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**Tango+**

Automated, low-artifact blood pressure and HR measurement with upper arm cuff specifically for treadmill application.

External system with a wide range of applications.
GPS module for MetaMax®

Even out in the field you can be kept informed about the moment-to-moment speed and altitude. Additional spatial data are recorded alongside the metabolic exercise test data and make it possible to specify the workload even without a bicycle ergometer.

PC, Notebook, second monitor and color printer

Our MetaSoft® software works with Microsoft® Windows® XP and Windows® Vista™. On request we can supply you directly with the complete, customized hardware such as a PC or notebook with operating system, second monitor and color printer.