ERGOS ™ WORKSIMULATOR

- Advanced Work Performance Testing
- Accurate Functional Capacity Testing
- On-Going Work Therapy

Ergos General
Ergos Unit 1
Ergos Unit 2
Ergos Unit 3
Additional Features
Above all the Ergos™ Work Simulator is a flexible system to assess work and/or job related physical capacities. The system is completely based on job simulation principles. All tests are conducted in the context of the job demands. On the Ergos™ Work Simulator the evaluatee is always considered in relation to his or her (future) job. The concept of the Ergos™ Work Simulator is based on the true nature of work and the assessment methodology is consistent with this concept. The most evident work related principles form the basic for the concept and methodology of the Ergos™ Work Simulator:

Ergos assessments are focused on functionality as “work” should always create a “surplus” value. On an operational level functionality is defined as the result of the interaction between Endurance (sustained activity tolerances) and Productivity. A worker should not only be able to bring the necessary endurance (like for instance being able to bend frequently), but also, while bending, create productivity by developing and sustaining a sufficient work pace.

All tests on Ergos are constructed on the principle of the Unity of the body. On the job a worker does not lift for the sake of lifting or bend for the sake of bending. A worker bends in order to do a certain job task, for instance move an object. In order to be able to do this task the worker must not only bend but also and simultaneously rotate the trunk, use the legs, move the arms in different directions and use his hands and fingers. All Ergos tests are based on the UNITY of the HUMAN BODY, thus simulating the reality of physical work.

The results of each physical activity depends on the (integral) interaction of Strength, Body Mechanics, Cardiovascular Endurance, Movement Speed and Movement Accuracy. As the focus of the assessment is on whether or not the evaluatee can successfully deal with (the) job demands the Ergos Work Simulator can be primarily described as a (physical) Capacity Test. However the test content and test data can be easily used to analyse eventual deficits in work and work-therapy related concepts. For each of the activities on Ergos it is not only clearly defined which of these principles are appealed to, but also to which intensity.
The ERGOS ™ Work Simulator uses computerized (Windows NT operating system, USB driven interfaces, touch screens and infrared network) related testing components to measure physical and functional capacities as they relate to work performance. Three on-line computers linked to a remote master station computer control the ERGOS system. The entire system, consisting of three separate testing units, measures the following areas of work performance:

- **Static and Dynamic Strength**: pushing, pulling, lifting and carrying, integrating a series of repetitive lifting, carrying and walking activities.
- **Whole Body Range of Motion**: standing and walking tolerances, bending, stooping, crouching, kneeling, overhead and forward reaching, integrated body rotations and material handling.
- **Seated Work Tolerance**: systematically measurement of upper extremity functions on reaching, handling, fingering, feeling, range of motion, wrist flexion/extension, hand grip strength, pinch strength, finger flexion and wrist pronation/supination.

Each of the ERGOS units operates as a physical/functional capacities evaluation and can be set to an individualized work conditioning/treatment program. Professionals who provide vocational assessment and evaluations, restorative therapies and work therapies can use the ERGOS ™ Worksimulator to insure controlled measurement and an effective return to work environment. Standardization, Objectivity, Reliability and Validity as well as ease of use are the hallmarks of the ERGOS ™ Work Simulator. ERGOS uses modern state of the art computer devices, including touch screens and USB driven test devices, interactive digital voice communication at each unit to provide standardized instruction graphically, orally and in a written form. The ERGOS also provides immediate visual performance feedback. Touch screen scanning technology allows an evaluator or therapist to record standardized observations easily. The master station computer assembles and stores all data from each of the three testing units. A report generator built into ERGOS features a combination of narrative and graphic presentations of evaluatee performance.
ERGOS ™ WORKSIMULATOR GENERAL ASPECTS

A TRULY INTEGRATED VOCATIONAL/MEDICAL MODEL OF EVALUATION, THERAPY AND WORKHARDENING

ERGOS ™ Work Simulator offers a truly integrated vocational/medical model for providing services to industrially or otherwise injured workers. Traditionally a vocational model for service delivery uses work sampling, job tryout and psychometric testing to measure a worker’s ability to obtain and retain a (specific) job. A medical model concentrates on the worker’s health by using the sciences of physiology, biomechanics and therapy. Ergos ™ Work Simulator integrates these two models and adds the measurement sciences of ergonomics and engineering. This unique combination provides the following features:

- A standardized, Objective, Reliable, Valid and accurate method of vocational evaluation and work therapy
- Equipment that measures all the relevant physical elements of Labor and analyses the physiologic and biomechanics aspects of these elements
- A technique for integrating the medical and vocational teams through evaluative, prescriptive and restorative activities

Static shoulder lift

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ERGOS WORKSIMULATOR UNIT 1
STATIC AND DYNAMIC STRENGTH

Unit 1 has three distinct assessment components – measurement of static/isometric strength and dynamic/isotonic strength (lifting and carrying) using industrial standards.

Ergos Static strength testing provides unique measurement of left side/right side body strength, while working through a protocol that measures maximum voluntary, sustained effort, and pounds/kilograms of effort simultaneously. The eight position, three trail protocol provides evaluators and therapists immediate feedback to compare against job standards and against Department of Labor DOT Standards and National Institute of Safety and Health (NIOSH) guidelines.

Dynamic strength features an industrially designed lifting box using real weight from 10 to 120 pounds/5 to 60 kilograms. Detailed velocity curves identify ascending (miometric) movement and descending (pliometric) movement from floor to industrial bench and shelf height. Integrated static and dynamic software establishes differences between the two testing procedures, which then indicates the probable recovery range for workers.

On Dynamic Carrying Strength the worker follows a series of integrating, repetitive, selecting/sorting, lifting, carrying, walking and climbing activities to evaluate work endurance. The worker assembles a series of progressive heavier work trays which are carried over certain distances and placed on a scale to validate weight carried. Workers response time is electronically sensed and compared to international industrial standard time (MTM methodology).
The Ergos Unit 1 static and dynamic measurement component is a comprehensive, reproducible and valid assessment of strength as it relates to effective work, using for instance:

- **Maximum Safe Lifting Limits** - NIOSH guidelines
- **Average Lifting Frequency** - Dictionary of Occupational Titles (DOT): occasional, frequent, constant
- **Lift Origin and Destination** - ascending and descending lift velocity (miometric and pliometric)

- **Static Lifting Ankle Height**
- **Real time on screen performance feedback**

Lifting from floor to industrial shelf height

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ERGOS WORKSIMULATOR UNIT 2

WHOLE BODY RANGE OF MOTION

Unit 2 measures industrial whole body range of motion. Biomechanic movement is controlled and measured through systematic analysis of the worker while demonstrating in excess of 100 movements and work activities. The unit features the following major work movements categories:

- **Overhead Reaching**: Hyperextension of the spine, with elbows parallel to shoulders and hands working overhead, while extending the arms and hands in any direction.
- **Forward Reaching**: Neutral position while standing, performing upper extremity work manipulation by extending the arms and hands in any direction.
- **Bending/Stooping**: Bending the body downward and forward by bending the spine at the waist.
- **Crouching**: Bending the body downward and forward by bending the legs and the spine.
- **Kneeling**: Bending the legs at the knees to come to rest on the knee or knees.
- **Balancing**: Maintaining body equilibrium to prevent falling when walking, standing, stooping, crouching or kneeling.

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The ERGOS Unit #2 is a comprehensive, reproducible and valid assessment of whole body industrial range of motion for evaluation, planning work therapy and return to work. Control for measurement without restricting body movements enables the evaluators, therapists to observe and record body compensation techniques of the worker.
Unit 3 provides eleven distinctive testing and screening categories, designed to assist and evaluate upper extremity functions. Eleven tasks, representing in excess of 50 activities, develop a comprehensive picture of upper extremity work function. Some of the testing categories on unit 3 are:

- **Handling**: Seizing, holding, grasping, turning or otherwise working with the hand or hands (fingering not involved).
- **Fingering**: Picking, pinching or otherwise working with the fingers primarily (rather than with the whole hand or arm as in handling).
- **Flexion / Extension**: Isolated isometric wrist flexion/extension strength testing produces a clear functional capacity rating.
- **Hand Grip Strength**: Sustained hand grip is measured using unique ERGOS methodology.
- **Pinch Strength**: Functional pinch strength is measured in two formats (1) key pinch and (2) three-point pinch.
- **Pronation / Supination**: Isolated isometric wrist pronation/supination strength testing produces a comparative functional capacity rating that relates performance to job demands rating systems.
ERGOS WORKSIMULATOR UNIT 3

Ergos Unit 3 progressively and systematically measures upper extremity work tolerance in a comprehensive, standardized, reproducible and valid way. All activities are designed and related to job functions and job simulation.

Handling

Pinch Strength

Grip Strength

Pronation / Supination Strength
Additional Features

- **DOT Protocols**
- **Self Made Protocols**
- **Computer Generated Reporting**
- **Method Time Measurement**
- **Coefficient of Variation**
- **On screen performance feedback**

Job Description Program - 14,000 Job Description with all the relevant physical job demands – based on the Dictionary of Occupational Titles).

Options to create job or client specific test protocols in which the intensity of the test activities can be set based on the intensity of the job activity.

All Test results are identified in Full color graphs in both the narrative and detail reports.

Clients Performances are compared to Nationally and Internationally Accepted Industrial Time Work Standards.

Integrates and analyzes strength data for consistency of effort and calculates Coefficient of Variation.

During actual Testing all Test results are on screen and in real time identified in Full color graphs.

On screen Performance Feedback on Carrying
ERGOS™ WORKSIMULATOR

Additional Touch Screen for Discomfort and Heart Rate Registration

Static Lifting Strength
Shoulder height, Both hand

Test results are on screen and in real time identified in Full color graphs.

Computer Generated Instruction:
Verbal, Written and Video

All Test Results are identified in both numerical and graphic form.
Overall Strength related Test results are identified in Full color graphs and show clients performance compared to industrial strength categories.

Test data are analyzed for consistency of effort. Coefficient of Variation is automatically calculated.