



The BCS Test

Thank you for your interest in our program for assessing cardiovascular fitness and overall physical capacity to perform job-related physical tasks. Several years of research studying the physical stresses imposed on fire fighters culminated in the development of this program; our extensive field studies have confirmed both the **safety** and the **validity** of this unique approach to occupational and rehabilitative medicine.

Cardiovascular Fitness: In brief, cardiovascular fitness implies general functional capacity and is the foundation for overall physical fitness, and it can be **measured** with research precision. Unfortunately, that measurement requires the subject to exercise to the point of total fatigue or exhaustion while expired gases are collected and analyzed to determine his/her capacity for consuming oxygen. (Since the heart's capacity to increase its output of oxygenated blood is the limiting factor in this metabolic function, this test **doubles as an indicator for cardiac capacity, or health**, thus the term cardiovascular fitness.) One cannot overemphasize the importance of this measure—both in terms of physical fitness assessment and cardiovascular health. As valuable as it is, this measurement is so technically demanding and expensive that it is limited to the research laboratory and is rarely used in practical applications concerning physical screening for either health or employment purposes. Indeed, in addition to technical difficulty and expense, an exhaustive bout of exercise is not without risk.

The Biomedical Computer Systems' Test

The technology implemented in our program is based on sound physiological principles which allow one to accurately estimate cardiovascular fitness (i.e. aerobic capacity) from cardiovascular responses to precise but **moderate** work loads on a precision cycle ergometer.

Test Administration: The subject's heart rate response to six minutes of exercise on a precision cycle ergometer are continually analyzed by our computer program which adjusts that work load as necessary to assure that it imposes an adequate challenge, but still remains at a safe level for all subjects. For example, the test workload would be considerably higher for the athlete than for the sedentary subject; higher for the young sedentary than for the older sedentary, and etc. To date this test has been successfully implemented for large numbers of normal working-age individuals as well as for older, less physically and medically sound subjects/patients. Both the safety and the validity of this test are the products of the quality control, which is inherent in this program.

Test Safety: The work intensity is carefully controlled to allow American Heart Association guidelines to assure that it is optimally safe **even for those with known heart disease**.

Cost-effectiveness: The field-proven safety of this test means that it can be administered without either (1) a medical exam to clear the individual for testing, or (2) medical supervision during the test. Non-medical personnel who can be trained to become expert in administering this computer-guided program can administer in an office setting and the test.

Application

Preventive Medicine: This test provides valuable information relative to an individual's general cardiovascular health, and in that sense, it becomes the basis for any quality wellness and/or preventive medicine program. Test results are very motivating to the individual, either as a wake-up call that it's time to begin an exercise program or as a very satisfying confirmation that present exercise programs are effective in maintaining a respectable level of cardiovascular health and fitness.

In addition to the cardiovascular fitness assessment, this program generates a personalized exercise-conditioning program, which guides the individual in the most appropriate use of a variety of modes of exercise for optimal safety and effectiveness. Follow-up fitness assessment, recommended at 16-week intervals, provides a very motivating progress report, which instills considerable confidence and overall satisfaction in one's training regimen.

Entry-level Fitness for Duty (Occupational Medicine): This is perhaps the most critically important function provided by this program. We have determined the energy requirements and overall physical stresses imposed by a variety of physically demanding occupational career fields, and one's physical readiness to perform these occupational tasks—both in terms of successful job performance and assuring optimal personal safety in performing those tasks. The task-relevance information provided by our program is truly impressive. Also, it is very important to understand that some tests (i.e. fire fighter agility tests, rescue tasks, all-out running tests for fitness, and etc.) can impose significant risk to the less than perfectly healthy applicant for physically strenuous career fields. (See current legal suit against the City of Albuquerque by the family of an employee who died while performing a required 1.5 mile run fitness test.) In brief, our fitness assessment ***provides task-relevant information safely***, i.e. from moderate exercise as opposed to the risks involved in asking the applicant or the employee to perform the actual task. Put another way, as a minimum our fitness assessment should be offered to the applicant/employee ***as a screening device***; those who run the greatest risk of injury imposed by an exhaustive fitness-for-day test could be identified and counseled before such a life-threatening test is administered.

Rehabilitation: The fitness assessment provided by our program provides an objective and scientifically valid appraisal of one's rate-of-gain in physical capability during rehabilitation from injury or illness.

Prediction of Future Performance: Although most jobs in America can be classified as sedentary, i.e. not requiring any unusual level of physical strength or endurance, it is well-known (and documented) that those in excellent health are least apt to be absent from the job—for any reason. In addition to experiencing significantly lower incidence of absenteeism, individuals who exhibit better than average levels of cardiovascular health are less likely to become medically disabled—for any reason—and thus the obvious reduction in both medical and retirement costs.

In brief, our program provides a state-of-the-art method for safely and validly assessing cardiovascular fitness*. This information is extremely valuable to the employer, both with respect to the individual's (applicant's) present capability to perform physical tasks and/or to the individual's relative risk of experiencing future interruptions in even sedentary job performance. This program has been adopted by the Department of Defense as mandatory for all military fire fighters, world-wide, and it has been adopted by the Air Force Surgeon General as the official fitness assessment program for military members of the Air Force—both for those in sedentary as well as physically demanding career fields, and it now provides the basis for all Air Force wellness programs. It is ***optimally safe for administering without medical involvement***, and it is a ***scientifically valid estimate*** of the criterion method for determining true aerobic capacity (i.e. cardiovascular fitness) in both genders from ages 15 through 80+ years.

Our approach is to provide you with the equipment, both hardware and software, to implement this quality program. In addition, a Biomedical Computer Systems' fitness expert will install this equipment/program and conduct an intensive 12-hour hands-on training seminar for those designated to implement and administer it.

Dr. Loren Myhre

***NOTE:** Muscular strength and endurance assessment and training programs are included in our overall physical assessment. Together with a measure of cardiovascular fitness, an individual's capability for the sustained performance of a physically demanding task is accurately determined.