CITY OF COLUMBUS POLICE AND FIRE MEDICAL PROCESS
Cardiovascular Fitness Testing
Methods and Procedures

The City of Columbus administers a cardiovascular screening as part of its pre-employment medical process for police officer and firefighter candidates. The medical exams occur after a candidate has received a conditional offer of employment. This document describes the procedures for the cardiovascular fitness test, commonly known as the stress test. This information may be of interest for candidates with an offer of employment who are preparing for their stress test or to individuals interested in applying for police officer or firefighter.

Graded Exercise Testing Protocol

The protocol to be used for the graded exercise test is the most well studied and widely used protocol designed for the motorized treadmill. The Bruce Protocol, developed by Robert Bruce, and described below is the most appropriate for a population of healthy, asymptomatic individuals.

The protocol is a continuous graded exercise test which includes no rest between work stages and each stage of work is more difficult than the previous. This protocol is designed to elicit maximal levels of work for most individuals within a reasonable period of time, usually 8-15 minutes.

Levels of work and the time period of each stage are noted below:

Stage	Duration (min)	Treadmill Speed (mph)	Treadmill Grade (%)
1	3	1.7	10
2	3	2.5	12
3	3	3.4	14
4	3	4.2	16
5	3	5.0	18
6	3	5.5	20
7	3	6.0	22

For approximately one minute at rest and during the entire test oxygen consumption (VO2) will be measured continuously. Maximal VO2 is the best available measure of cardiovascular fitness (the power of the aerobic system.) The average VO2 during each 20 second period of exercise is calculated by the online computer and can be printed at test end. The highest recorded 20 second average value measured during the test is compared to developed standards to make the final determination of the success or failure of the candidate to meet the standard. Values for VO2 are expressed in milliliters of oxygen used per kilogram of body weight per minute (ml/kg/min.) This is the customary description when a determination of cardiovascular fitness with reference to work or exercise is of interest.

The standards are derived from research which developed expectations for cardiovascular fitness of the general population to maintain health and fitness as well as specific investigation regarding the status and expected capability of Columbus police and fire. These standards have been determined to be applicable to candidates and incumbent police officers and firefighters based upon these findings. In 2001, the standards were reviewed and revised.

Procedures

Upon arrival at the exercise testing room, the candidate will read and sign an informed consent form which explains the purposes of the test, the procedures to be followed and the risks associated with the testing. The candidate will then change into appropriate exercise clothing if necessary. The procedures of the test are then verbally explained and the candidate is encouraged to ask questions should he/she have any. Next, electrodes for the 12 lead ECG measurement are applied and a supine ECG is recorded, followed by a standing ECG. A standing resting blood pressure measure is also taken. The candidate is then oriented to the proper method of walking on the treadmill and the procedure for stopping the test. Headgear, mouthpiece and nose clip are put on and the gas collection and the protocol begins. During each stage of the protocol, the ECG is continuously monitored and the blood pressure is measured. The test is terminated in the event of an abnormal response in the ECG, or blood pressure, but usually stopped at that point when the candidate can no longer continue due to leg fatigue or shortness of breath. Upon termination, gas collection equipment is removed and a 2-4 minute period of slow walking followed by a 4-6 minute period of sitting rest serves as the monitored recovery period.

During the test, the candidate is encouraged to do his/her best; that is, to continue as long as possible. Upon completion, testing personnel are not immediately aware of the measured maximal VO2 generated by the candidate and in any case, will not inform the candidate of his/her status with regard to meeting the standard.