

One-Mile Walking Test

The one-mile walking test is an evaluation of cardiovascular fitness that seeks to predict an individual's aerobic capacity, which is also known as VO_2 max, or maximal oxygen consumption.

The one-mile walking test was developed by researchers in 1986 as an alternative assessment to accurately predict an individual's aerobic capacity following a one-mile track walk. The test is both indirect and sub-maximal in nature, making it considerably easier to implement in field-based scenarios. While the test should be completed on a track or suitably flat terrain, it could reasonably be replicated on a treadmill.

The one-mile walking test is designed for both men and women aged 20-69 of varying levels of fitness. As the test only requires a participant to perform a brisk walk, it is also suitable for deconditioned participants, older adults, or those that are overweight.

Research conducted in 2011 found the one-mile walk test to be a valid predictor of VO_2 max and a reliable alternative to the 1.5-mile run test that is widely used by the military.

Cardiorespiratory Fitness

Cardiorespiratory fitness is important because it provides a measure of how efficient the cardiovascular (heart and blood vessels) and the respiratory system (lungs and airways) must work in order to take in and deliver oxygen to every cell in the body.

During exercise, the demand for oxygen increases and so the cardiorespiratory system must increase its workload in order to match this demand. The more efficient the lungs can become at taking in oxygen, and the more the cardiovascular system can be at delivering it to the active muscles, the more cardiorespiratory fitness an individual will possess.

A positive correlation between oxygen demand and workload/exercise intensity exists. Therefore, those people that are able to consume and deliver more oxygen, have a greater capacity for aerobic exercise (e.g. they can exercise at a higher intensity and for longer).

The maximal oxygen uptake is widely accepted as the criterion measure of cardiorespiratory fitness. As previously stated, this may also be described as aerobic capacity, or VO_2 max. Aerobic capacity is usually expressed as millilitres of oxygen used in one minute per kilogram of body weight ($ml/kg/min^{-1.0}$).

VO₂ max is the maximum amount of oxygen that an individual can consume, deliver and use in a minute to fuel intense physical activity or exercise. Most direct tests of VO₂ max will use a gas analyser and require that the participant works to exhaustion. However, because of the positive and somewhat linear relationship between heart rate and oxygen consumption, it is possible to estimate VO₂ max using indirect tests like the 1-mile walking test without having to subject participants to the physical stress and discomfort of a maximal test. Not to mention the cost of the gas analysis equipment!



Performing the Test

Like any other fitness assessment, adequate planning and preparation is important to ensure that test results are accurate and reliable. Before starting the test, it will be necessary to ensure that the following equipment is available:

- Heart rate monitor (most fitness trackers have these)
- Stopwatch
- Appropriate clothing and footwear

It will also be necessary to source a suitably flat 1-mile surface, ideally a running track. If using a 400m running track, the route should be calculated as a little over four laps around the track to cover the test distance (1609 metres).

Perform a light warm-up for around 5-10 minutes, including some gentle aerobic activity and some light stretches. Take a short break (2-3 minutes) and commence the test as follows:

- Attach the heart rate monitor and ensure that it is correctly measuring heart rate
- Start the stopwatch and commence walking
- Walk the planned route as quickly as possible without running or skipping
- Ensure that throughout the test, there is always 1-foot on the ground
- On completion of the distance, stop the clock and record the heart rate immediately

Refer to the Calculating Aerobic Capacity section below for the VO₂ max calculation.

Calculating Aerobic Capacity

In order to calculate a VO₂ value, the following information will be needed from participants:

- Age (years)
- Gender (male = 1, female = 0)
- Body weight (pounds)
- Time to complete walk (minute and seconds – expressed as a percentage)
- Final heart rate (BPM)

The formula for calculating VO₂ Max using the 1-mile walk test is as follows:

$$132.853 - (0.0769 \times \text{Weight}) - (0.3877 \times \text{Age}) + (6.315 \times \text{Gender}) - (3.2649 \times \text{Time}) - (0.1565 \times \text{Heart rate})$$

For example, if a 30-year-old man weighing 180lbs completed the one-mile walk test in 12 minutes and 15 seconds and his post-test heart rate was 165bpm, VO₂ max would be calculated as follows:

$$132.853 - (0.0769 \times 180) - (0.3877 \times 30) + (6.315 \times 1) - (3.2649 \times 12.25) - (0.1565 \times 165)$$

13.842
11.631
6.315
39.995

$$\text{VO}_2 \text{ max} = 47.88 \text{ ml/kg/min}$$

Alternatively, you can use the 1-mile walk-test calculator below: