



COACHING IRELAND
OILIÚINT ÉIREANN

What is $\dot{V}O_{2max}$?

$\dot{V}O_{2max}$ (Maximum Oxygen Uptake) is a measure of your performance engine. It is the upper limit to the body's ability to consume oxygen, thus setting the upper limit to produce energy aerobically. Therefore, the higher an athlete's $\dot{V}O_{2max}$, the better equipped they are to perform aerobic-based activities.



Endurance athletes such as; cross country skiers, long distance runners, road cyclists and rowers have been shown to have some of the highest $\dot{V}O_{2max}$ values recorded. Several years of training are necessary to achieve such high values; however their genetic predispositions also have major influence on this value.

Although a high $\dot{V}O_{2max}$ is important for endurance athletes; their ability to exercise for prolonged periods at a high percentage of their $\dot{V}O_{2max}$ ($\% \dot{V}O_{2max}$) is equally important and is far more sensitive to training. Thus a high $\dot{V}O_{2max}$ alone does not determine good performance.

$\dot{V}O_{2max}$ is measured in units of litres of oxygen consumed per minute (L/min). Since athletes come in all shapes and sizes, $\dot{V}O_{2max}$ is often expressed relative to body weight (ml/kg/min), especially in sports where the athlete must carry their own weight over a distance (running). Generally for sports where body weight is supported (cycling, rowing and canoeing) $\dot{V}O_{2max}$ expressed in L/min is more appropriate.

Normative $\dot{V}O_{2max}$ Data for Top Level Athletes

Athlete	$\dot{V}O_{2max}$		Source
	Male	Female	
Top class marathon runners	73.4 – 85.8 ml/kg/min	56.4 – 66.0 ml/kg/min	Billet et al (2001)
Professional road cyclists	4.4 – 6.4 L/min		Mujika & Padilla (2001)
Elite Road cyclists		3.7 – 4.1 L/min	Martin et al (2001)
Rowers (National Standard)	4.9 – 6.2 L/min (HW) 4.3 – 5.1 L/min (LW)	3.5 – 4.6 L/min (HW) 3.1 – 3.8 L/min (LW)	Hahn et al (2001)