

Physiological, metabolic and haematological effects of the endurance zones

Effect	REC Easy	E-1 Steady	E-2(a) Steady+	E-2(b) 1/2M Strong	E-3 10ml Hard pace	E-4 VO2 3k V.Hard pace
Increased blood volume	*	****	****	***	*	
Stimulation of Aerobic enzymes		***	***	***	****	*
Stimulation of fatty acids as a fuel source	*	****	***	**	*	
Improved use of Lactate as a fuel				**	****	***
Increased maximum rate of muscle glycogen utilisation				**	****	****
Increased capillarisation	*	***	****	***	***	**
Improved blood and muscle buffering capacity				**	***	****
Increased Max. cardiac output			*	**	***	***
Increased ventilatory capacity				*	***	****
Improvement of Neuromuscular adaptation		*	*	***	****	***

- **** Maximum effect
- *** Very Strong effect
- ** Significant effect
- * Limited effect

Table 2.6: Physiological description of the training zones.

Classification	Definition	% of Max. HR (b·min ⁻¹)	% VO ₂ Max	Lactate * (mmol·l ⁻¹)
Recovery (REC) Easy	Active recovery, post-race, technique and warm up/ down.	< 60 %	<50%	< 1.0
Endurance One (E-1) Steady	Extensive Aerobic, base or volume training. Central adaptations and endurance development	60 % - 75 %	50 – 70%	< 1.5
Endurance Two(a) (E-2) Steady+	Intensive Aerobic, central and peripheral adaptations. Development of speed endurance.	76 % - 80 %	70 – 75%	2.0 - 3.0
Endurance Two(b) E-2) Strong	Intensive Aerobic, central, peripheral and neural (speed) adaptations.	81 % - 86 %	75 – 85%	3.0 - 4.0
Endurance Three (E-3) Tempo/Threshold	An-aerobic Threshold. (AnT). Development of Velocity at AnT. Peripheral and nervous system adaptations.	87 % - 92 %	85 – 90%	3.0 - 7.0
Speed Transition VO ₂ max. (E-4) Very Hard	Anaerobic Glycolysis Lactate tolerance, max.power and nervous system adaptations.	90% - 95 %	90 – 100%	7.0 – 8.0
Speed and Strength	Increased blood buffering, neural recruitment, FT recruitment	95% - 100%	100 – 130%	8.0 – 20+

* Approximation