

Energy systems used when training

When coaches design training sets, they have to take into account what type of energy system or systems they wish their swimmers to train. There are several different ways of classifying energy systems however we mainly deal with the following classification: Endurance 1, Endurance 2, Endurance 3, Sprint 1, Sprint 2 and Sprint 3.

In the tables below each system is described in detail in terms of

- The distance each system will be trained per session
- The duration that system will be trained for each session
- The heart rate required to be training within each system.
- The percentage of maximum heart rate required to train in each system.
- The amount of rest required when training each system.
- Examples of training sets using each energy system.
- The Effects and reason for training each system.
- Training emphasis during each system

7 ENERGY ZONE SYSTEM	Set Distance (m)	Set Duration (min)	HR (bpm)	HR (% max)	Work:Rest	Sample Set (*for Sr. Age Group swimmer)
AEROBIC (recovery)	Variable	Variable	< 140	< 70	N/A	600 Easy Swim
AEROBIC DEVELOPMENT (EN1)	1500 - 4000	≥ 15	140 - 160	70 - 80	10 - 30 sec rest	6-10 x 400 Swim/ 10 sec rest
AEROBIC/ANAEROBIC MIX 1 (EN2)	800 - 2000	10 - 40	160 - 180	80 - 90	15 - 30 sec rest	4-6 x 300 Swim 15 sec rest
AEROBIC/ANAEROBIC MIX 2 (EN3)	600 - 1600	8 - 30	180 - Max	90 - 100	30 - 60 sec rest	4-8 x 150 Swim/ 30 sec rest
ANAEROBIC 1 (SP1)	200 - 600	2 - 15	Max	100	2:1 - 1:1	2-3 sets of 6-8x50 race tempo / 10-30 sec rest or 4 x 125 Rotate IM/ 45 sec rest
ANAEROBIC 2 (SP2)	200 - 600	4 - 12	Max	100	1:2 - 1:4	4 x 75 Swim/ 3-4 min rest or 6 x 50/ 2 min rest
SPRINT (SP3)	25 - 100	1 - 2	Max	100	1:3 - 1:4	4-6 x dive 15m/ 1 min rest or 6-8 x 12.5 Swim/ 45 sec rest

7 Energy Zone system	GENERAL/SPECIFIC	EMPHASIS
Aerobic (Recovery)		Drills, some recovery work
Aerobic development 1 (Endurance 1)	Has an overall general effect: Increase in stroke volume SV (amount of blood being pumped by the heart). Improves capillary network & transport of energy. Improves fat metabolism.	Perfect technique, Distance Per Stroke (DPS), efficiency. Criteria used to determine training speed. Priority order: Pulse, Stroke count or tempo, time of the repeat/speed
Aerobic/ Anaerobic mix (Endurance 2)	Effect specific to the working muscle. Enhances steady state where lactate is removed or "used" as fast as it's produced.	Perfect technique, Distance Per Stroke (DPS), efficiency. Criteria used to determine training speed. Priority order: Pulse, Stroke count or tempo, time of the repeat/speed
Aerobic/ Anaerobic mix (Endurance 3)	Has both general and specific effects. GENERAL: Max O2 uptake and delivery to the working muscle. (Very dependant on SV and red cell mass). SPECIFIC: Both removal rate and levels of tolerance of lactic acid in the working muscle	Technique, Distance Per Stroke (DPS), efficiency. Criteria used to determine training speed. Priority order: Tempo, Time of repeat, stroke count, pulse rate.
Anaerobic 1 (Sprint 1)	Has both general and specific effects. GENERAL: Improves delivery of energy through anaerobic sources. Improves pain threshold (mental) SPECIFIC: Improves buffering capacity of the working muscles. Improves tolerance of lactic acid buildup in the working muscle	Emphasis shifts away from technique work, and more towards racing and challenging the athletes. Criteria order of importance: Speed, tempo, stroke count, pulse rate
Anaerobic 2 (Sprint 2)	SPECIFIC: Max lactate production. High end tolerance and buffering capacity.	Emphasis on racing skills. Criteria: Speed, tempo
Sprint (Sprint 3)	SPECIFIC: Enhances usage creatine pool by the working muscle	Perfect technique at Max velocity for short distances. Should as the season progresses be race tempo specific.