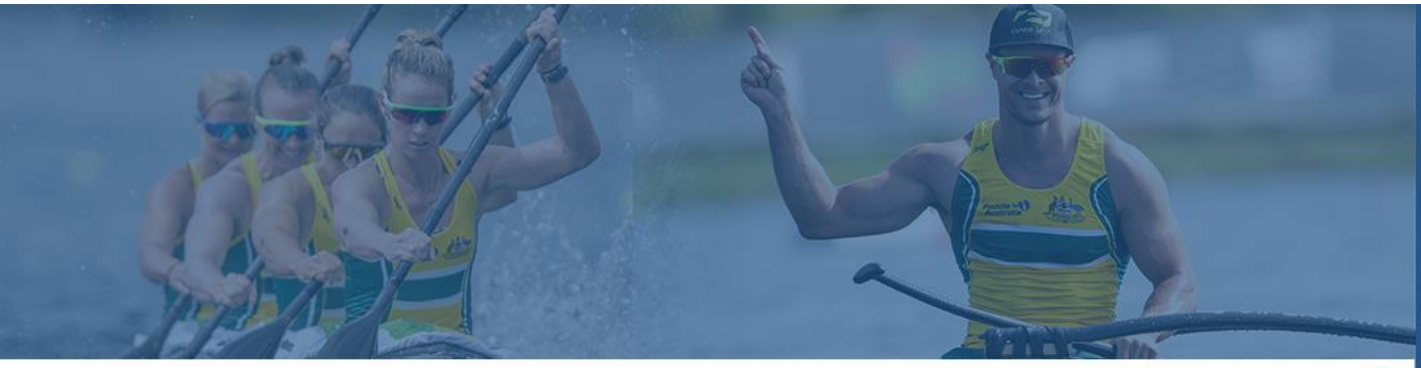


PERFORMANCE & RECOVERY INFORMATION

Training Zones and Energy Systems

AIS Paddle Australia

The only useable source of energy for the muscle contraction is adenosine triphosphate (ATP). There are three energy systems which resynthesize ATP with the aim to maintain a steady flow of ATP to the muscle so it can keep contracting.

Energy systems do not work independently; rather they all work at the same time but the relative contributions of each energy system is dependent on the overall intensity and duration of exercise. Training improves the energy delivery systems and should align to the demands of the event.

ATP-CP SYSTEM

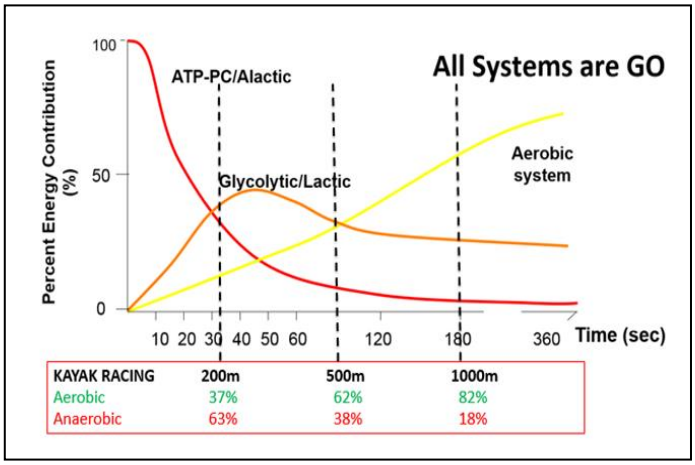
- Provides energy for ~10s and takes about 5 mins to fully restore
- Immediate energy source from ATP stored in the muscle for extremely quick and explosive activates such as the standing start
- Minimal lactate is produced as this energy system is too short in duration (alatic)

GLYCOLYTIC SYSTEM

- Provides the bulk of energy production during high-intensity efforts from 30s -2 mins and takes 24-48h to replenish
- Main energy source is carbohydrates
- As the duration and intensity of exercise increases lactate is produced faster than it can be cleared
- Linked to anaerobic power, local muscular endurance, muscular power and speed
- ↑ skeletal buffering capacity
- ↑ efficiency of lactate removal
- ↑ tolerance of high levels of muscle/blood lactate
- Develop ability to maintain technique under duress and race specific performance

OXIDATIVE SYSTEM

- Primary energy sources for events >2 mins and most efficient, long term method of energy production.
- Dependent on a constant supply of oxygen and uses fat and carbohydrates as the main source of fuel
- Provides the majority of ATP needed to perform long-duration low intensity exercise
- ↑number, size and efficiency of mitochondria which produce energy in cells
- ↑ total red blood cell number which transport more oxygen to the working muscle
- ↑ number of capillaries to muscle so more oxygen can reach the muscles
- Helps with recovery between high intensity efforts and allows for activity to occur for a longer duration at higher intensities by delaying fatigue



The contribution of each energy system will vary across the same race distance as team boats are faster than K1's, men are faster than women and seniors faster than juniors. The faster the distance is covered, higher percentage contribution from the ATP-PC and glytolytic systems

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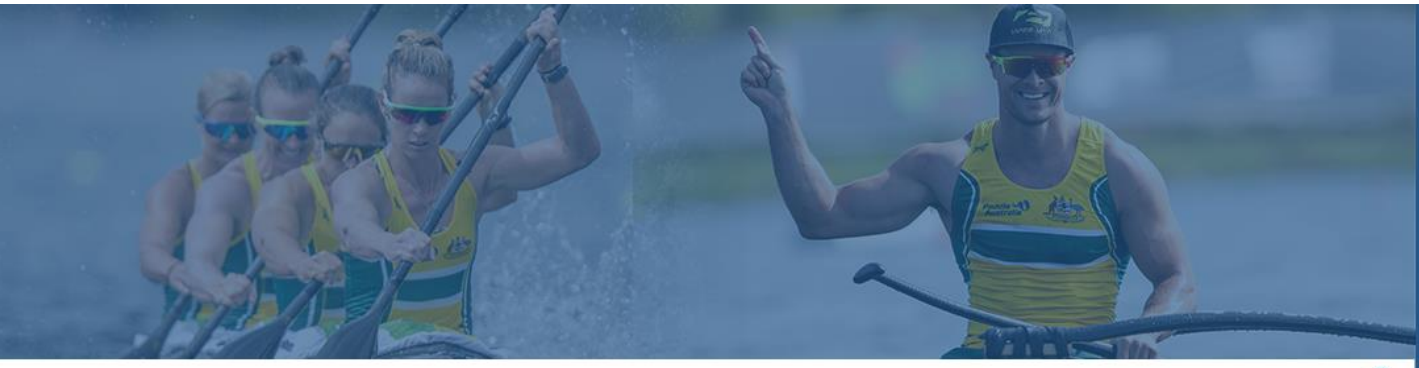

PERFORMANCE & RECOVERY INFORMATION

AIS Paddle Australia

Training Zone	Description	Blood Lactate Threshold Relationship	Blood Lactate (mM)	Percent HRmax (%)	Percent VO_{2max} (%)	K1 Stroke Rate (spm)	Borg's RPE Scale	Exercise Time to Exhaustion
T1	Light Aerobic	Below LT1	< 2.0	60-75	< 60	< 60	Very Light	> 3 hrs
T2	Moderate Aerobic	Lower half b/w LT1 & LT2	1.0-3.0	75-84	60-75	56-72	Light	1-3 hrs
T3	Heavy Aerobic	Upper half b/w LT1 & LT2	2.0-4.0	82-89	75-85	70-82	Somewhat Hard	20 min-1 hr
T4	Threshold	LT2	3.0-6.0	88-93	85-90	75-92	Hard	12-30 mins
T5	Maximal Aerobic (1000-m race pace)	Above LT2	> 5.0	92-100	90-100	88-110	Very Hard	5-8 mins
T6	500-m race pace	Above LT2	> 8.0	100	-	106-120	Very, very Hard	1-2 mins
T7	200-m race pace	Above LT2	> 6.0	-	-	115-140	Almost Maximal	30-50 s
T8	Sprints	-	-	-	-	> 130	Maximal	10-15 s

- Training zones are a guideline and as the session progresses you naturally approach the next training zone due to cardiovascular drift which is the upward *drift* of heart rate over time while exercise intensity remains constant.
- Stroke Rates are used as a guideline and will be very individual depending on training age and strength
- If prescribed an easy aerobic/light paddle, you should not be for instance at threshold/hard for most of the session
- Threshold is sometimes called anaerobic threshold or lactate threshold: This zone indicates the upper limit of equilibrium between lactate production and lactate clearance
- 200m and Sprints: unlikely to reach your maximal heart rate as the duration is not long enough for the heart rate lag to catch up with the short duration of the effort

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