



Bike Science

Precision Bike Fitting

BIKE PERFORMANCE TESTING REPORT

PERSONAL DATA

Name: Test Rider

Date of Assessment: 1st January 2015

Sport / Level: Road/ Criterium Racing

This report details how you performed in the assessment, and how the results can guide your training.

RESULTS

Blood Lactate Response to Exercise

The most important part of the testing results are the blood lactate results. This is how we pinpoint your thresholds, your training zones, evaluate improvements and areas that require work. These thresholds determine your potential to perform at various types of events. The reason we use lactate to determine your training zones is that lactate has a direct correlation to fatigue and fuel usage. Where you have high levels of lactate, you also experience high levels of fatigue. Our goal through training is to lower the lactate level for a given power output – that way you are generating more power while experiencing less fatigue and becoming more fuel efficient, which in turn makes you faster.

Figure 1 shows the relationship between each of our defined thresholds and the duration which the athlete can expect to maintain each intensity level. Defined thresholds are the Aerobic Threshold, the Lactate Threshold and Power at VO₂max. For most cycling events, the Aerobic Threshold and Lactate Threshold are the most relevant to performance.

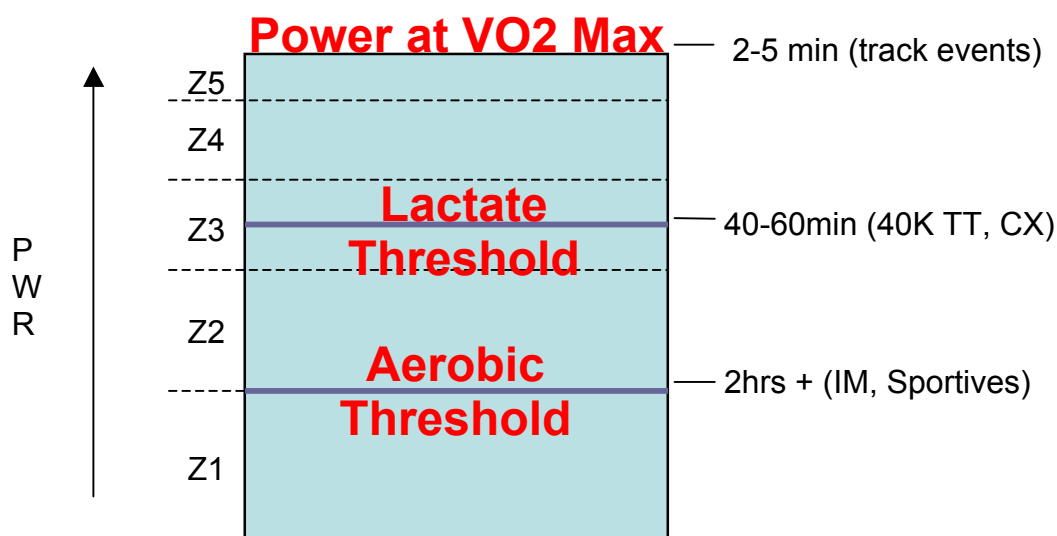


Figure 1

The Aerobic Threshold is the critical threshold for most endurance events that last 2 hours or more. You can think of it as the power output you can maintain for prolonged periods without significant fatigue. The Lactate Threshold is the tipping point of power production between aerobic and anaerobic sources. This intensity is not sustainable for more than an hour, and requires a significant amount of recovery if maintained for more than a few minutes. Power at VO₂ max is the threshold that is most closely related to performance in events lasting 2- 5 minutes. This level of power output creates a large amount of fatigue and often requires complete rest to recover from.

Your Aerobic Threshold occurred at **245 Watts**, at **140 beats/minute**. Your Lactate Threshold occurred at **295 Watts** and at a heart rate of **147 beats/min**. Your Power at VO₂ max was **375 Watts**, at a heart rate of **182 beats/min**. All of your thresholds can be raised through proper training.

Stage	Power (Watts)	Heart Rate (bpm)	Lactate (mMol)
1	212	123	1.2
2	240	139	1.9
3	278	152	2.6
4	308	164	5.3
5	345	174	9.9
6	374	182	13.0

*Note: 2 minutes of stage 6 completed

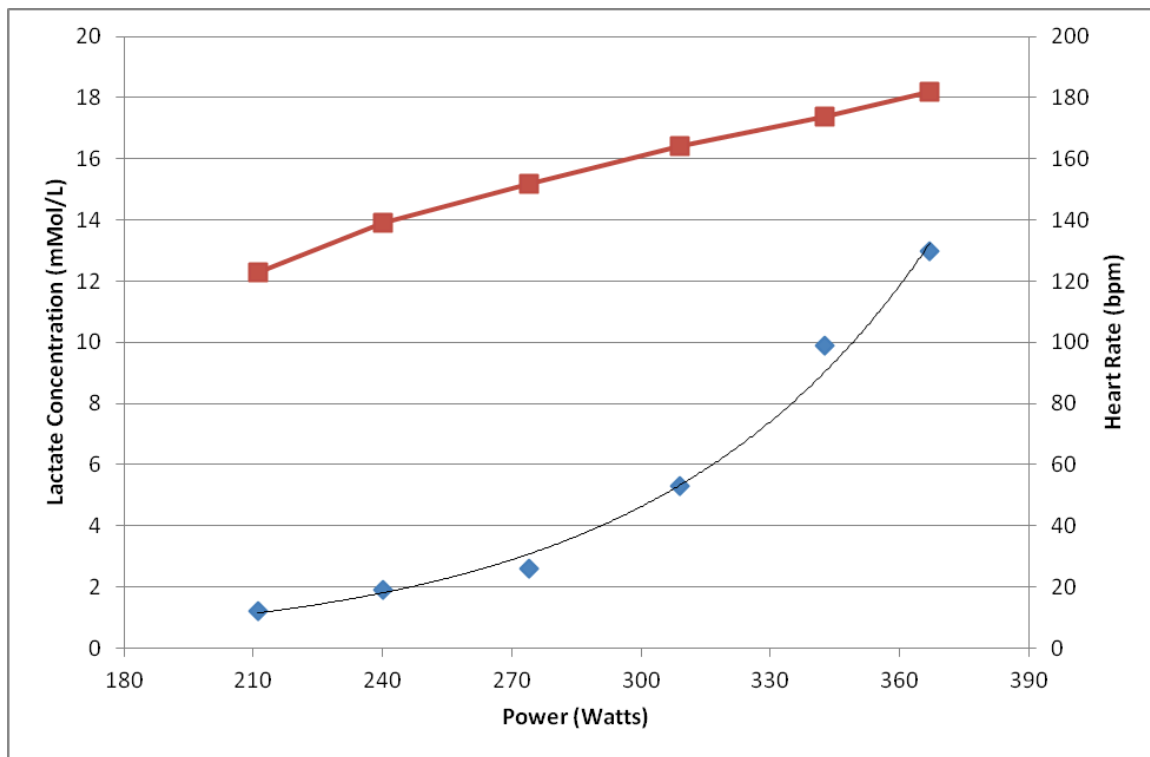
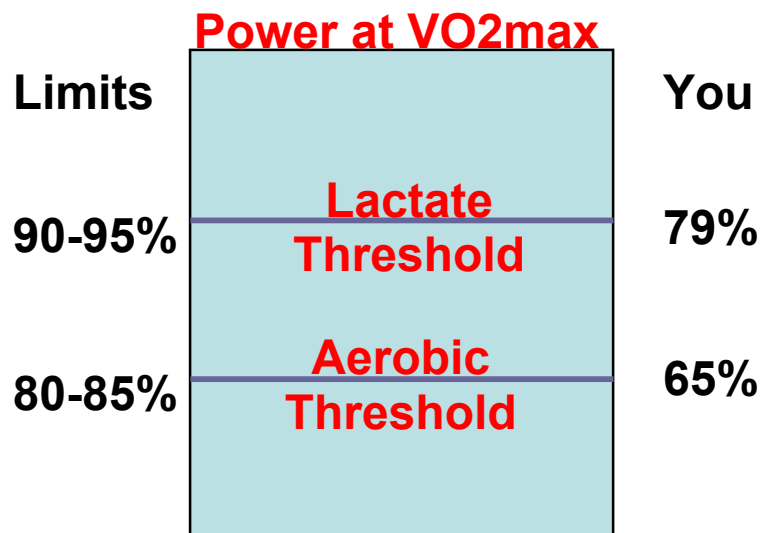


Figure 1. Graphical Representation of your Sub-maximal Response to Exercise

SUMMARY

<i>Weight (kg):</i>	82	<i>Total Time (min):</i>	17
<i>Height (cm/ft&in):</i>	180	<i>Max Heart Rate (bpm):</i>	182
Maximum Aerobic Power (Watts & Watts/kg):	375 4.57		
Stage Time (min):	3.00	Last Stage Completed (Watts)	345
Aerobic Threshold (Watts) (% of maximum)	245 (65%)	Lactate Threshold (Watts) (% of maximum)	295 (79%)



WHAT DOES YOUR PROFILE TELL US?

Based on the requirements of your event and looking at how your thresholds relate to each other tells us what type of training will be most efficient for you to see performance improvements over the next 3-4 months. Your performance at most endurance events depends most heavily on your aerobic threshold and lactate threshold. If you are below the limit ranges, it means you'll see the biggest performance improvements to your aerobic threshold and lactate threshold by focusing your time on training them directly. When your aerobic threshold gets into the 80-85% range of your max aerobic power (power at VO2max), it starts to become difficult to improve your aerobic threshold, because the lactate threshold and maximum aerobic power are getting in the way. As your lactate threshold gets into the 90-95% range of your maximum aerobic power, it starts to become difficult to improve your lactate threshold, because the maximum aerobic power is getting in the way. In each of these cases, you first need to improve your maximum aerobic power before you'll be able to make any significant improvements to your aerobic threshold.

TRAINING ZONES

The information we gained from the test can be used to determine specific training zones so that you can get the most benefit from your workouts. The following guidelines are specific for you but are based on work done by Dr. Al Reed at the University of Ottawa. They take into account your blood lactate and your heart rate responses to the test you performed in the laboratory. The following table shows your 5 training zones and describes the heart rates (HR) and power output you would need to work at to get the most benefit from your training. The importance of each of these zones depends on your profile and the specific intensity and duration requirements of your event.

What do mean?

Training Zone	Heart Rate (bpm)	Power (Watts)
1	125 - 140	195 - 245
2	141 - 143	245 - 285
3	144 - 150	285 - 300
4	151 - 166	300 - 330
5	167 - 182	330 - 370

the Zones

Zone 1 - Improvement of aerobic fitness, & recovery between hard workouts - Continuous for at least 45 min. & greater. Longer duration is important to improve your Aerobic Threshold and build the aerobic base.

Zone 2 - Intermediary zone – This should only be trained if your event uses this zone. This is commonly referred to as the junk miles zone. You should do a minimum of Zone 2 training if you are preparing for key events that will require racing in this zone.

Zone 3 - Red Lining zone - To train removal of lactic acid and increase lactate threshold: Increase intensity to the top of your zone for 3-6 min. Then recover back down at the bottom of your zone, then go up again and so on, until you cannot go up again while keeping a good technique (20-60 min.). Ideally Zone 3 sessions are done by power in a controlled environment but heart rate can work as well.

Zone 4 - Over and Under – This is another event specific zone so you train it if your event requires it. Reduction of lactic acid accumulation at intensities higher than lactate threshold: Climb up to a HR at the top of your zone for 3-10 minutes and then recover close to the bottom of your zone 1 for 5 minutes. Repeat until you cannot maintain proper technique when going at the top of your zone.

Zone 5 -Aerobic Interval Training - Lower production of lactic acid and increase removal from high lactic acid concentration: climb to a speed at the top of your zone 5 or higher for 1-3 minutes and then recover back down to the bottom of your zone 1 for 2-6 minutes.

COMMENTS

The results from your test today indicate that the largest improvements you can make in the coming months are in your aerobic threshold. By training below this threshold you will concentrate on improving the power produced by your type one muscle fibres, thus improving your ability to ride using a combination of fats and carbohydrates, whilst not producing significant amounts of lactate. An added advantage of more developed type one fibres is that they have the ability to take lactate out of the blood and utilise it as fuel, allowing you to recover better between high intensity periods of activity. In combination with this low intensity training it would be good to keep working on your lactate threshold with one session each week. As your race season comes closer, try to either alternate between Lactate Threshold and Power at VO_2 max workouts, or squeeze both in each week if you have the time.

These results give us an indicator of your current fitness profile, and can be used to assist training and monitor improvement. The regularity that you wish to complete these re-evaluations is entirely up to you, but we recommend you build them into your training program every 3 to 4 months. In 12 weeks your body will have adapted to your training and your training zones will have changed. Re-assessments ensure that you are continually training at the optimal intensities that will lead to progressive performance improvements.

Please do not hesitate to contact us if you have any further queries. Good luck with your training and racing!