



## VO<sub>2</sub>LT Performance Testing

Helping you be the best you can be

### Sample Report – Cycle Test Lactate Threshold & VO<sub>2</sub> (max) Assessment

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Thanks for your time today, as promised, here is my report based upon our conversation and assessment.

This assessment was provided to provide you with an overall cycling blood lactate and (expired air) VO<sub>2</sub>(Max) test so that you can plan your training for the event and, on the basis of these result, I think you are in very good shape to address the upcoming training program, and I would suggest that you take a look at some more interval work to expand your anaerobic range.

During this test I noticed that you showed a slight imbalance in your cycling stroke and I will forward a video of this and there are some recommendations to address this at the end of this report.

The overall fitness summary is shown on the attached “Session Summary”, this is followed by two graphs “VO<sub>2</sub> & Heart rate Curve” and “Blood Lactate & Heart Rate Curve”.

#### **Body composition and resting state**

Your Blood pressure & resting heart rate is excellent when compared with norms for the general population at 53 beats/minute & BP of 122/66

Your max HR during the test was 183 which give you a “working range” of 130 (183-53) beats.

Your HR recovery from the Max was rapid dropping 20 beats/ minute from 178 (near peak) in 70 seconds (reduction of 1beat/ in 3 secs) an indication of your excellent cardiac fitness.

Similarly your body composition is also excellent. Please note that the Body Mass Index (BMI) is overstated as your ratio of muscle to body fat is outside (on the “good” end) of the general population range used for this calculation. You have a low body fat % of 9.3% or around 7kg. This is probably about as low as you should aim for as you target IronMan. You will need to maintain a reasonable amount of body fat for (a) fuel and (b) insulation (both heat & cold) for the race.

Your waist to hip ratio is good. On a general note, this is something to keep an eye on as this ratio is an indicator of possible cardiac risk if it approaches (and exceeds “1”).

#### **Exercise Protocol**

We ran a progressive cycling exertion test on a Daum Premium 8i Ergocycle, ramping the required power output (after you had a warm-up) from 100 watts in increments of 40 Watts every 4 minutes. At the end of each 4 minute step, a blood sample was taken from the distal point of your right index finger, this was analysed using a “Lactate Scout Pro” analyser.

Concurrent with this test your respiration was continuously monitored with a FitMate Pro Oxygen and Co2 gas analyser via a full face (silicone) mask. Your Heart rate was monitored continuously via a Polar HR chest strap..

I have plotted your HR and Lactate curves against the power output, and these graphs appear at the end of this report.

### Exercise Results

Your peak heart rate of 183 was reached during the 30<sup>th</sup> minute of the test at around the point that you were no longer able to maintain the effort.

Your VO2(Max) was 53.2 (ml Oxygen per Kg of body weight per minute) – this would put you in the “superior” category on most VO2 charts.

Your anaerobic threshold (AT) at 135 beats/minute has been assessed on the point at which your blood lactate begins to noticeably rise, indicating that your muscles are no longer receiving the full level of oxygen needed.

Your lactate threshold (LT) at 150 beats/minute has been assessed at the point at which your blood lactate rises rapidly indicating that your body is no longer able to “mop-up” excess lactate and acidity levels in your muscles are reaching the point at which muscle operation is becoming impaired. This also coincides with the point at which you find it hard to control your breathing rate.

You appear to have a relatively tight “anaerobic zone” heart rate range (the gap between your AT & LT’s), but you’re able to tolerate a comparatively high level of blood lactate (11mmol/l) at your VO2(max). This will limit your ability to perform well in sprint to Olympic distance type events

This zone is therefore something that could improve (ie you can train your body to “mop up” lactate better as you can train briefly for with high levels of blood lactate in your system). You can do this by adding a few more interval session to your programme & I suggest you have a word with your coach on this.

### Recommended Training Zones

The tests gave the following results

Resting HR	53				
Max HR	183	<b>VO2 (Max)</b>	<b>53.2</b>		
HR Range	130				
		<b>% Of Max HR</b>	<b>% of usable HR Range</b>	<b>VO2</b>	<b>%VO2 (Max)</b>
Aerobic	118	64%	50%		
Aerobic Threshold	135	74%	63%	35	66%
Lactate Threshold	150	82%	75%	42	79%

<b>ZONE</b>	<b>HR &amp; Power</b>	<b>Notes</b>
Easy Zone (Fat Burning Zone)	Below 120 Bpm / 140Watts	Your easy HR zone is up to 120 Bpm and is where you should target your recovery sessions.
Endurance (Aerobic) Zone	Between 120Bpm / 140Watts  And up to  135 Bpm /160 Watts	Your endurance zone is between 120 & 135 Beats/minute (appx 65% - 75% of your Max HR). This is your long distance “race pace” and you should aim to be in this range for your long sessions.
Anaerobic Zone	Between 135 Bpm /160Watts  And up to  150 Bpm / 250 Watts)	Use the 135-150 bpm (appx 75% - 82%) range sparingly for your up tempo sessions this zone is used to help bring your endurance zone up gradually, but doing too much here will tire you out for your long sets.
Lactate Threshold Zone	Above 150bpm / > 250 Watts	Getting your HR above 150 (90%+) will train your muscles to handle lactate build up and help you with hills. I would suggest one or two sessions per week with 5 – 10 repeats of very hard sprints with long rests (allow your HR to drop below 125).

### Notes on cycling stability

I noticed that you tended to “rock” the ergo cycle, indicating an imbalance in your cadence. The ergo cycle has “soft” rubber rockers making this more noticeable than on a real bike or static (wind) trainer.

In the video I took of you, it looks as though your LEFT knee tends to swing out as you enter the “down” phase of the stroke.

This imbalance may trigger;

- (a) groin chafing as you “rock” on the seat
- (b) shoulder / neck issues as you use your shoulders & arms to stabilize your upper body (see how your shoulders move in the video)
- (c) leg /hip issues as one leg is working harder than the other on the stroke (this imbalance is the force that causes the rocking)

This could be due to

- (a) Your cleat being misaligned in your shoe, wear in clear or pedal

- (b) A comparative weakness between your leg “adductors” (the ones that pull your knee ‘in’) vs your leg abductors (the one that pull your knee out) – this is a problem that some weight lifter & body builders encounter.

I suggest that you take a look at this on your own bike in a static trainer (or if you have access to a computrainer or “power tap” these will show your stroke imbalance very accurately) and either

- (a) Adjust cleat/pedal and/or
- (b) Work on some hip adductor strengthening exercises (either speak to your coach or I can suggest some)

## Summary

Overall you look in great shape to get in training for your event. You’re able to accommodate high levels of blood lactate, although your “anaerobic zone” heart rate range is quite limited but this will respond to interval training.

- (a) For your IM long rides please keep an eye on your upper HR & try to keep this below 140beats/min.
- (b) Please keep an eye on your body weight, you don’t have much body fat and so (given your musculature) you’re probably at your best weight (between 75 & 77kg depending upon your level of hydration). Track your weight twice day morning & at night & keep an eye on the average.
- (c) Also I suggest you check your cadence balance as noted above.

I hope you found the session of interest & value and would be happy explain any point further.

Please give me a call or drop me a line if you have any queries, comment or suggestions.

Best regards,

**Ray Pitch.**

021-949-835

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Last Name: [REDACTED]  
 First Name: [REDACTED]  
 Gender: **Male**

Age: **38**  
 Height (cm): **173.00**  
 Weight (Kg): **77.7**

Membership #: [REDACTED]  
 Report Date: [REDACTED]  
 Personal Trainer: **RP**

Our organization would like to thank you for participating in this fitness evaluation. Specifically, your results are as follows:

## Session Summary

### Fitness Index

<b>81</b>					
Very Poor	Poor	Fair	Good	Excellent	Superior
< 20	20 - 39	40 - 59	60 - 79	80 - 94	> 95

Overall Fitness Index, calculated as the average of all the tests performed in the current session.

### Body Mass Index (Kg/m<sup>2</sup>)

<b>26.0</b>					
Under w.	Normal	Over w.	Obesity I	Obesity II	Obesity III
< 18.5	18.5 - 25.0	25.0 - 30.0	30.0 - 35.0	35.0 - 40.0	> 40.0

Body Mass Index (BMI) is calculated by dividing the body weight in Kilograms by height in squared meters. Obesity-related problems may occur when BMI is over 25 Kg/m<sup>2</sup>.

### Waist-to-Hip Ratio (---)

Rank: 100% <b>Lower Risk</b>		
<b>0.82</b>		
Lower Risk	Moderately High	High Risk
< 0.90	0.90 - 1.00	> 1.00

WHR is the circumference of the waist divided by the circumference of the hips.

### Resting Heart Rate (bpm)

Rank: 83%					
<b>53</b>					
Superior	Excellent	Good	Fair	Poor	Very Poor
< 46	46 - 55	55 - 60	60 - 65	65 - 72	> 72

Number of heart beats per minute measured at rest. HR can be improved with aerobic training.

### Systolic Blood Pressure (mmHg)

Rank: 44%					
<b>122</b>					
Optimal	Normal	Hi Norm	Hypr Stg. 1	Hypr Stg. 2	Hypr Stg. 3
< 120	120 - 130	130 - 140	140 - 160	160 - 180	> 180

Highest value of blood pressure occurs when heart muscle contracts and pumps blood out into arteries. BP can be controlled by reducing intake of salt, performing adequate aerobic exercise, reducing body weight, avoiding smoking and stress.

### Diastolic Blood Pressure (mmHg)

Rank: 96%					
<b>66</b>					
Optimal	Normal	Hi Norm	Hypr Stg. 1	Hypr Stg. 2	Hypr Stg. 3
< 80	80 - 85	85 - 90	90 - 100	100 - 110	> 110

The lowest blood pressure measured in the arteries, it occurs when the heart muscle relaxes between beats.

### Body Composition (FAT%) (%)

Rank: 98%					
<b>9.3</b>					
Superior	Excellent	Good	Fair	Poor	Very Poor
< 10.0	10.0 - 13.9	13.9 - 17.5	17.5 - 20.5	20.5 - 24.2	> 24.2

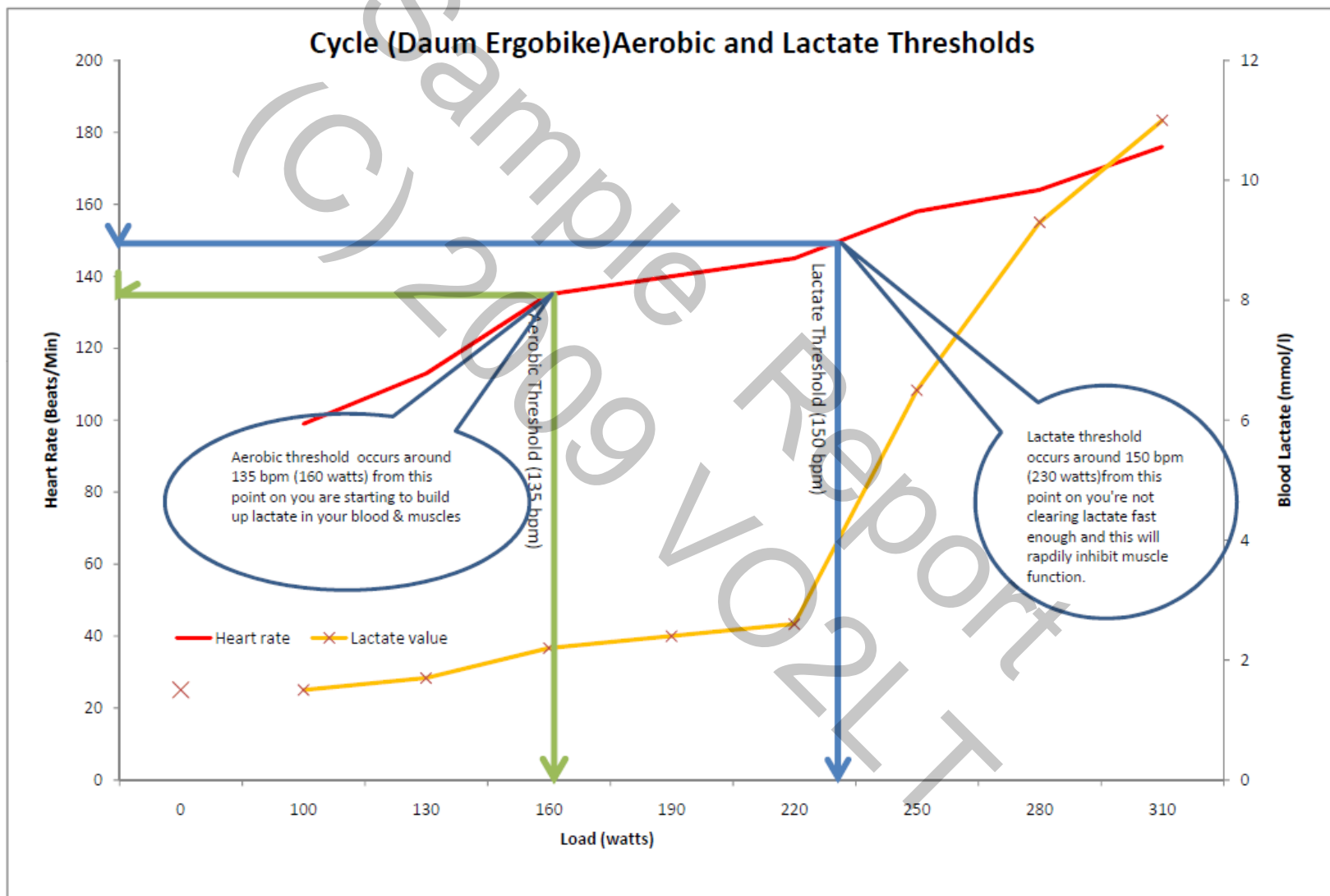
Fat% is the percentage of fat over the whole body mass.

### Cardio-respiratory Fitness (ml/Kg/min)

Rank: 96% <b>Measured</b>					
<b>53.2</b>					
Very Poor	Poor	Fair	Good	Excellent	Superior
< 35.4	35.4 - 38.9	38.9 - 42.4	42.4 - 46.8	46.8 - 52.5	> 52.5

The highest value of oxygen consumption of which a person is capable. Also called maximal aerobic power, provides information concerning the level of endurance training. High VO2 max values minimize CVD risks.

Ergo Cycle 100 - 310 Watts  
(Air temp 21.5, 85% rh)



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