

ALIXR

NAME:
Tai
Wheadon

DOB:
01/08/1996

Date of Test:
19/12/2025

Fitness Assessment Report

Welcome to the Alixr family

Thank you for choosing Alixr. At Alixr, we believe in *Measuring, Optimising, and Thriving*. Our philosophy is built on the power of data-backed science to unlock human potential.



Whether your goal is peak performance in sport, improved health, or a deeper understanding of your body, our mission is to provide clear, actionable insights that help you train smarter, recover better, and achieve more.

Why Sports Science Matters

Everybody is unique, and effective training requires more than guesswork. Sports science provides measurable insights into how your body functions, ensuring that training and recovery strategies are tailored to you. By combining physiology, performance testing, and data analysis, we help athletes and individuals of all levels reach their full potential safely and efficiently.

- Evidence-based
- Personalised
- Optimised
- Measurable
- Sustainable



Your Personalised Report

CLIENT



NAME:
Wheadon, Tai

DATE:
12/19/2025

TRAINER:
Heys, Alicia

Thank you, Tai, for coming in to complete the Running Elite Test with us on the 19th of December 2025. This report provides a summary of the data collected during your session, along with personalised training recommendations based on your results.

The aim is to provide you with some biometrics in relation to body, health and fitness. Additionally, to provide you with some insights on areas to potentially work on to develop your fitness further as an ultra-endurance athlete.

Extra Notes

Tai wants to improve his speed specifically when running uphill and downhill. He is extremely fit and competes in many ultra-running events. Typically, weekly mileage when not training for an event is 70–100km. He follows a healthy diet and fasts regularly. On the day of testing, his resting heart rate was 53 bpm, and his blood pressure was 141/96 mmHg.

FITNESS LEVEL

Very Low

Low

Fair

Good

Excellent

Superior



Summary of the Data

Height	179cm
Weight	72.8kg
BMI	22.7
Body Fat (%)	9.7%
LT1	16km/h (167bpm)
LT2	17.5km/h (176bpm)
VO₂ max	69.1ml/kg/min
Peak Heart Rate	188bpm
Peak Blood Lactate	8.7mmol
Peak Velocity	20km/h

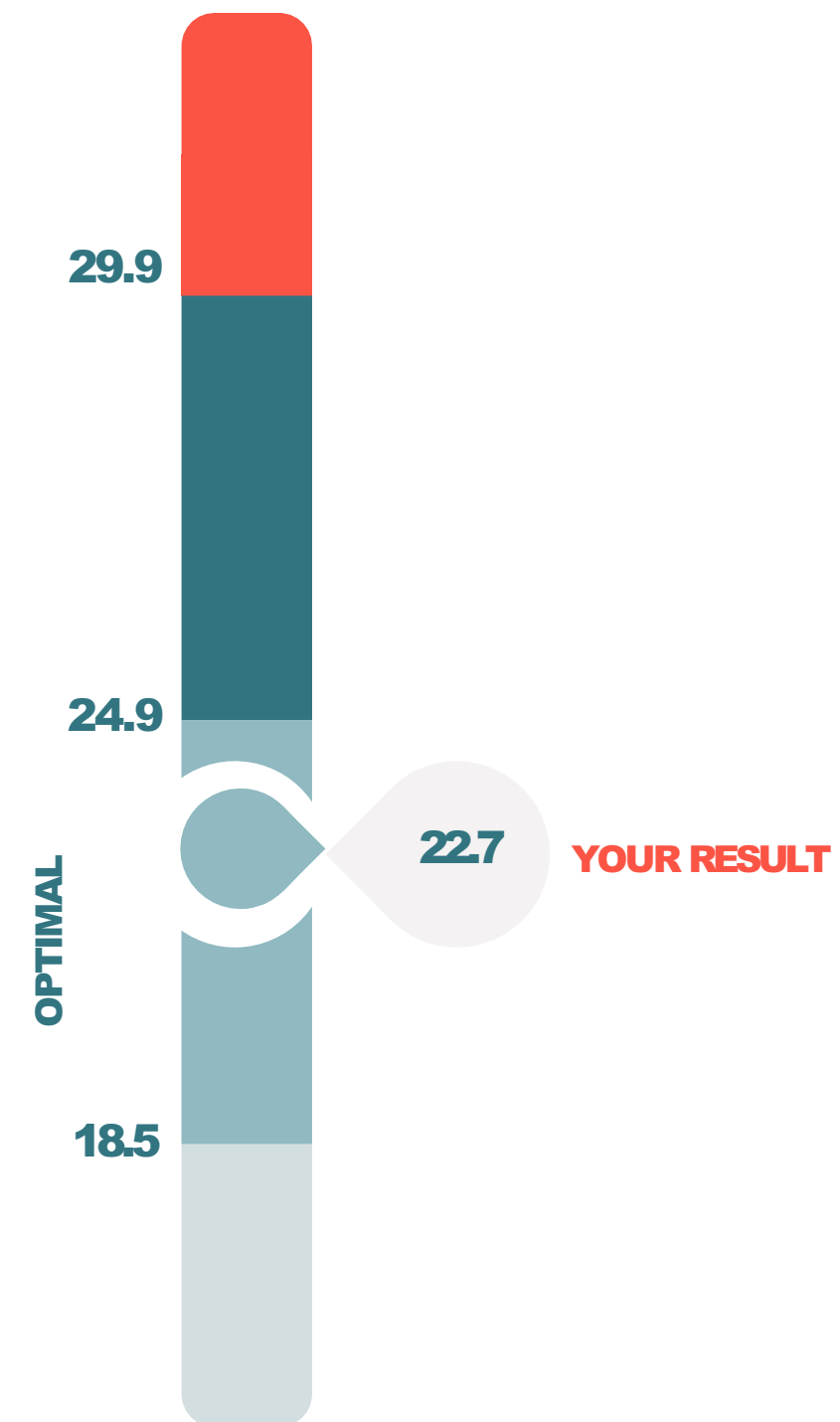
Speed (km/h)	Heart Rate (bpm)	Blood Lactate (mmol)	VO₂ (ml/kg/min)	RPE (1-10)
Resting	53	1.7	-	1
9	104	1.9	26.07	2
10	111	1.5	30.01	3
11	121	1.8	32.16	3
12	134	3.4	35.39	4
13	143	2	37.28	5
14	153	1.7	40.21	5
15	159	1.8	42.80	6
16	167	1.7	46.27	7
17	173	4.3	49.71	7
18	177	4.6	49.63	8
19	181	5.7	56.53	9
20	188	8.7	69.10	10

Body Mass Index (BMI)

Body Mass Index (BMI) is a quick calculation using height and weight to indicate whether someone is within a healthy weight range. While useful as a general guide, it doesn't distinguish between muscle, fat, or bone.

BMI RESULT

**22.7
OPTIMAL**



- Obese** – Significant risk of developing chronic disease, such as heart disease, cancer, cognitive, and metabolic syndrome
- Overweight** – Elevated risk of developing chronic disease. 50% more likely than individuals at Optimum
- Optimal** – Lowest Risk. Must be measured in combination with Body Composition
- Underweight** – High risk of weekend immune function, osteoporosis and accelerated sarcopenia

Body Composition

BODY FAT

7.1KG

BODY FAT %

9.7%

SKELETAL MUSCLE MASS

37.3KG

Body Composition Analysis

Total amount of water in my body	Total Body Water (L)	483 (39.6 – 48.4)
What I need to build muscles	Protein (kg)	13.0 (10.6 – 13)
What I need for strong bones	Mineral (kg)	4.39 (3.66 – 4.48)
Where my excess energy is stored	Body Fat Mass (kg)	7.1 (8.5 – 16.9)
Sum of the above	Weight (kg)	72.8 (59.9 – 81.1)



Fat Mass
9.7%

Fat-Free
Mass
90.3%

Your Rank 10% places you on the "Athletic" level. (based on Mayo Clinic research)



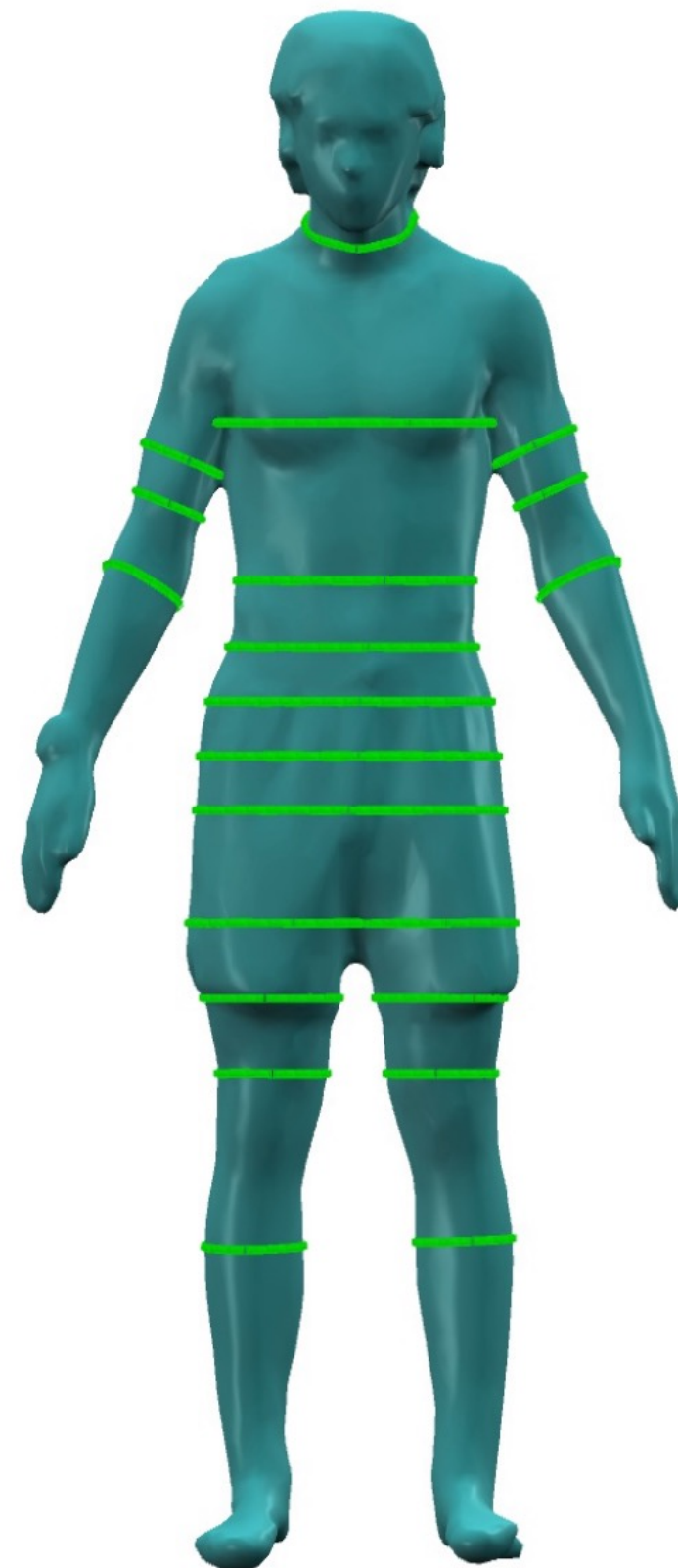
Compared With Others You have a lower body fat than 80% of men, between ages 20-29.



Body Measurements

Body Measurements (kg, cm)

Body Fat %	9.7
Fat-Free Mass %	90.3
Fat Mass	7.1
Fat-Free Mass	65.7
Bicep Left Lower	29.2
Bicep Left	31.9
Bicep Right Lower	29.4
Bicep Right	31.6
Calf Left	37.0
Calf Right	37.5
Chest	95.5
Forearm Left	29.3



Forearm Right	29.1
High Hip	96.2
Hip	98.6
Neck	38.0
Thigh Left Lower	39.1
Mid-Thigh Left	51.4
Thigh Left Upper	61.4
Thigh Right Lower	37.2
Mid-Thigh Right	50.9
Thigh Right Upper	63.8
Waist (Abdominal)	78.8
Waist (Lower)	88.8
Waist (Narrowest)	69.9

Basal Metabolic Rate (BMR)

What is BMR?

Basal Metabolic Rate (BMR) is the number of calories your body needs to maintain basic functions at rest, such as breathing, circulation, and cell repair. It represents the minimum energy required to keep you alive without any activity. Understanding BMR helps establish a foundation for daily energy needs, which can then be adjusted based on training load, lifestyle, and performance goals.

BMR is the number of calories your body requires at rest to sustain vital functions such as breathing, circulation, and repair. To calculate daily energy needs, BMR is multiplied by an **Activity Factor**

Activity Factor

Sedentary: $\times 1.2$
Lightly Active: $\times 1.375$
Moderately Active: $\times 1.55$
Very Active: $\times 1.725$
Extra Active: $\times 1.9$

Endurance athletes (e.g. marathoners, triathletes, ultra-runners) typically fall in the **1.7–1.9 range**, reflecting high training loads. Meeting these energy demands with quality carbohydrates, lean protein, and healthy fats supports performance, recovery, and long-term health.

1790kcal/day

BMR

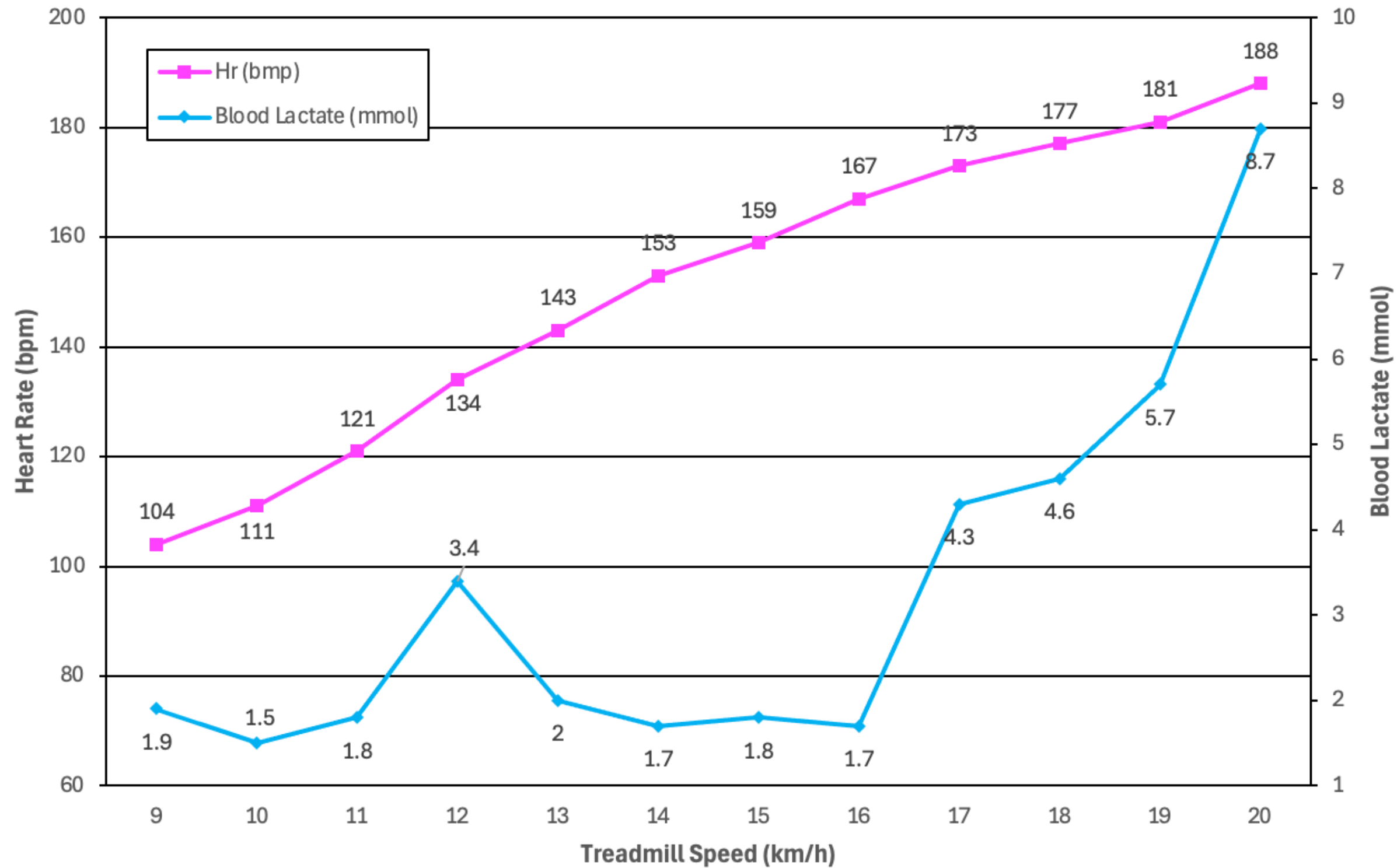
1.9

Activity Level

3,401kcal/day

Total

Lactate Response



Heart Rate and Blood Lactate Response throughout the test

Lactate Thresholds

Lactate Threshold Testing measures how the body responds to increasing exercise intensity by tracking blood lactate levels. It provides insight into aerobic and anaerobic energy systems, helping athletes identify precise training zones. By understanding where lactate begins to accumulate, training can be tailored to improve endurance, efficiency, and performance.

This is roughly the maximum pace that you could sustain for a full marathon

This is roughly the maximum pace that you could sustain for a half marathon

LT1 (First Lactate Threshold): This is the intensity where blood lactate first rises above resting levels. It reflects the body's shift from purely aerobic metabolism toward a gradual contribution of anaerobic energy. Training around LT1 helps build aerobic base, fat oxidation, and endurance efficiency.

LT1	
HEART RATE	167 BPM
SPEED	16 KM/H

LT2	
HEART RATE	176 BPM
SPEED	17.5 KM/H

LT2 (Second Lactate Threshold): This is the point where lactate accumulates rapidly, and clearance can no longer keep up. It represents the highest sustainable intensity before fatigue sets in. LT2 is closely linked to race pace for endurance events, and training here improves lactate tolerance and high-intensity stamina.

Training Zones

Zone 1: Recovery / Easy

Recovery, circulation, fat metabolism

- Speed: <14km/h
- HR: <155bpm

Zone 2: Endurance / Aerobic Base

Build aerobic capacity, efficiency, fat utilisation

- Speed: 14–16km/h
- HR: 155–167bpm

Zone 3: Tempo / Moderate

Improve muscular endurance, sustain faster pace

- Speed: 16–17km/h
- HR: 167–173bpm

Zone 4: Threshold

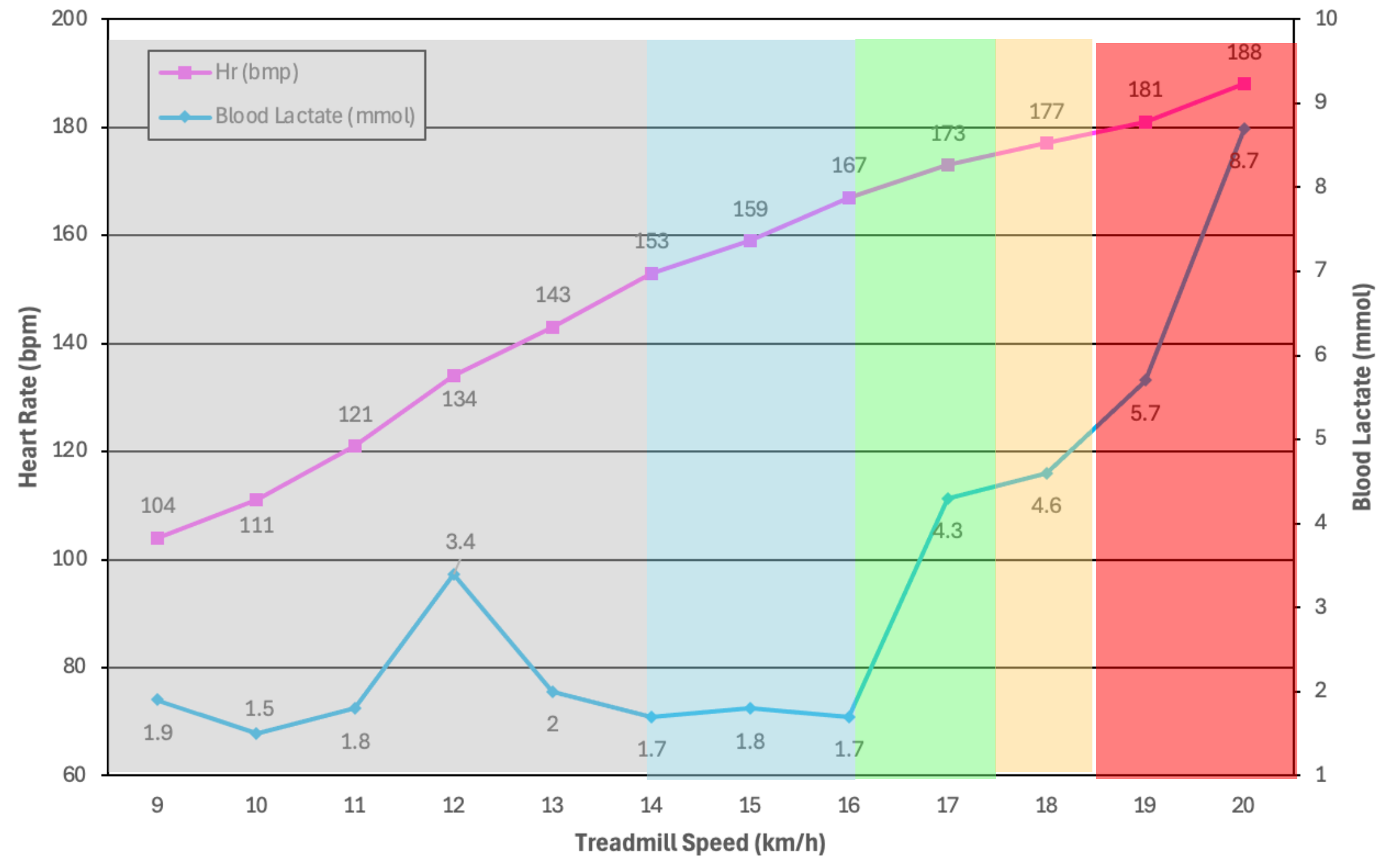
Increase lactate tolerance, raise sustainable race pace

- Speed: 17–18km/h
- HR: 173–177bpm

Zone 5: VO₂ Max / High Intensity

Boost VO₂max, speed, anaerobic capacity

- Speed: >18km/h
- HR: >177bpm



ZONE 1

Very light, conversational pace

ZONE 2

Comfortable, steady pace

ZONE 3

Comfortably hard effort, sustainable for long durations

ZONE 4

Hard effort, can be sustained for up to 60 minutes

ZONE 5

Very hard, short intervals

Training Summary

Your personalised training zones have been calculated from your lactate and heart rate responses during the test. The results show that your first lactate threshold (LT1) occurs at around 16.0 km/h (3:45 per km) and 167 bpm, while your second lactate threshold (LT2) is reached at around 17.5 km/h (03:26 per km) and 176 bpm. These points give us a clear picture of how your body responds to increasing intensity and provide a strong basis for your training.

LT1 represents the stage where lactate first begins to rise above baseline levels. Training around this point will help strengthen your aerobic base, improving efficiency and allowing you to sustain steady efforts at faster speeds over time. By shifting LT1 to a higher pace, you will be able to maintain aerobic running for longer before lactate build-up begins. LT2 reflects the stage where lactate accumulation becomes more pronounced and is closely linked to fatigue in shorter endurance events such as the 5k and 10k. Developing this point will allow you to hold faster paces for longer and is a key factor in lowering your race times.

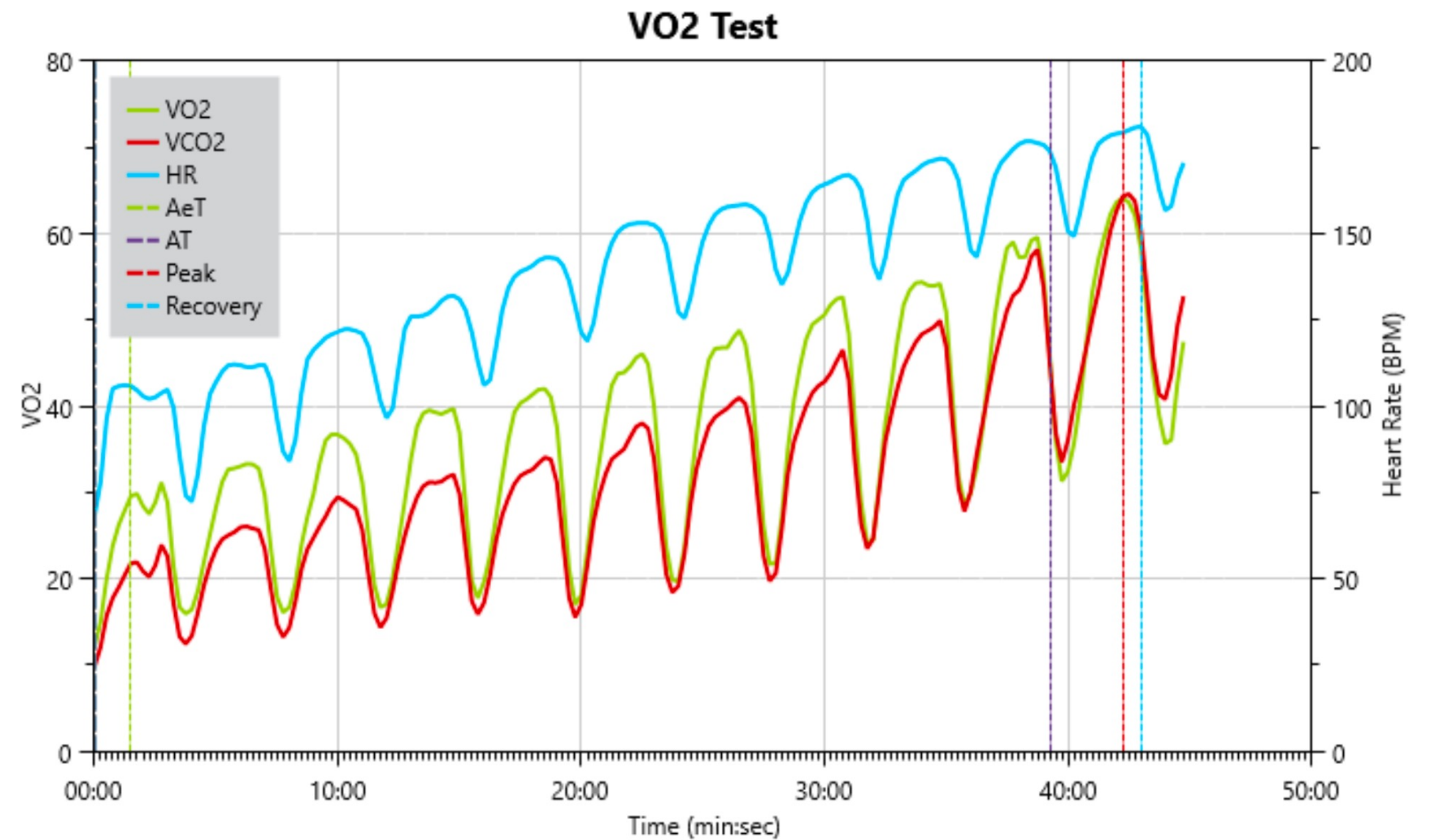
Overall, your results show an exceptionally high aerobic profile, you can run at a high pace while remaining predominantly aerobic, with minimal lactate accumulation. This reflects excellent aerobic efficiency, low physiological stress at moderate intensities, and a strong endurance base. You can tolerate and clear lactate at high speeds, allowing you to sustain demanding efforts for prolonged periods. Together, these results demonstrate a highly developed endurance system, providing a strong foundation for ultra-running performance and future speed development.

VO₂max

A VO₂ Max test is the gold standard assessment of your cardiovascular fitness and reflects the efficiency of your heart, lungs, and muscles in transporting and utilising oxygen during exercise

VO₂max:
69.10ml/kg/min

Absolute highest amount of oxygen your body can use during exercise



Training Summary

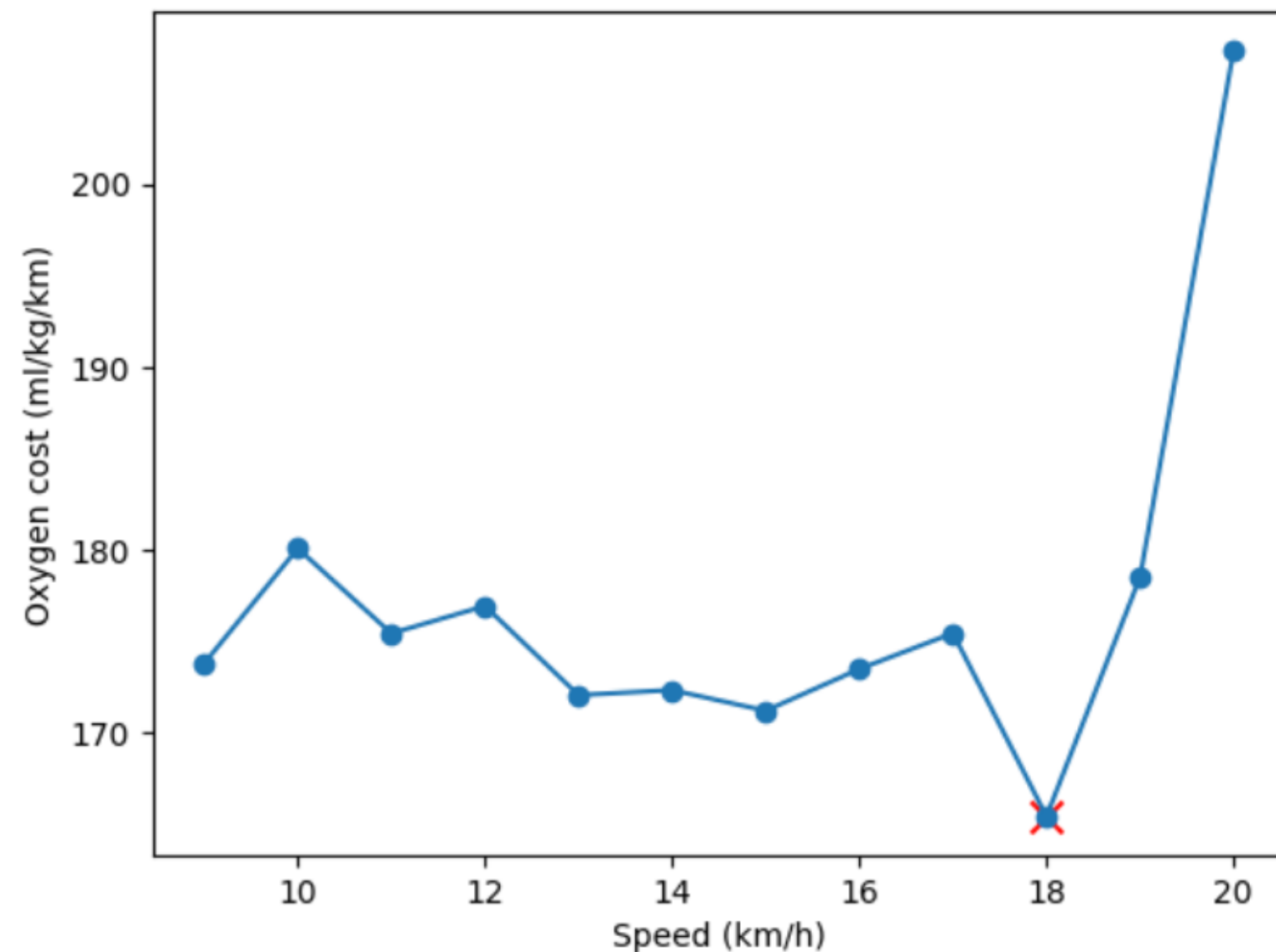
VO₂max measures your aerobic capacity – essentially, the **engine size** of your body. In your test, you recorded a VO₂max of **69.10 ml/kg/min**. For your age group (26–35 years), anything above 52 ml/kg/min is classed as *excellent*, so your aerobic capacity is already well above average.

For endurance running, lactate thresholds are often more important, as they show **how efficiently you can use that engine** at different speeds. Two athletes with the same VO₂max can run very different times depending on how late their lactate begins to rise. Improving your thresholds will allow you to sustain faster paces for longer, which is directly linked to lowering your 5k and 10k times.

	18-25 years old	26-35 years old	36-45 years old	46-55 years old	56-65 years old	65+ years old
Excellent	>56	>52	>45	>40	>37	>32
Good	47-56	44-52	38-45	34-40	32-37	28-32
Above Average	42-46	39-44	34-37	31-33	28-31	25-27
Average	38-41	34-38	31-33	28-30	25-27	22-24
Below Average	33-37	31-34	27-30	25-27	22-24	19-22
Poor	28-32	26-30	22-26	20-24	18-21	17-18
Very Poor	<28	<26	<22	<20	<18	<17

Running Economy

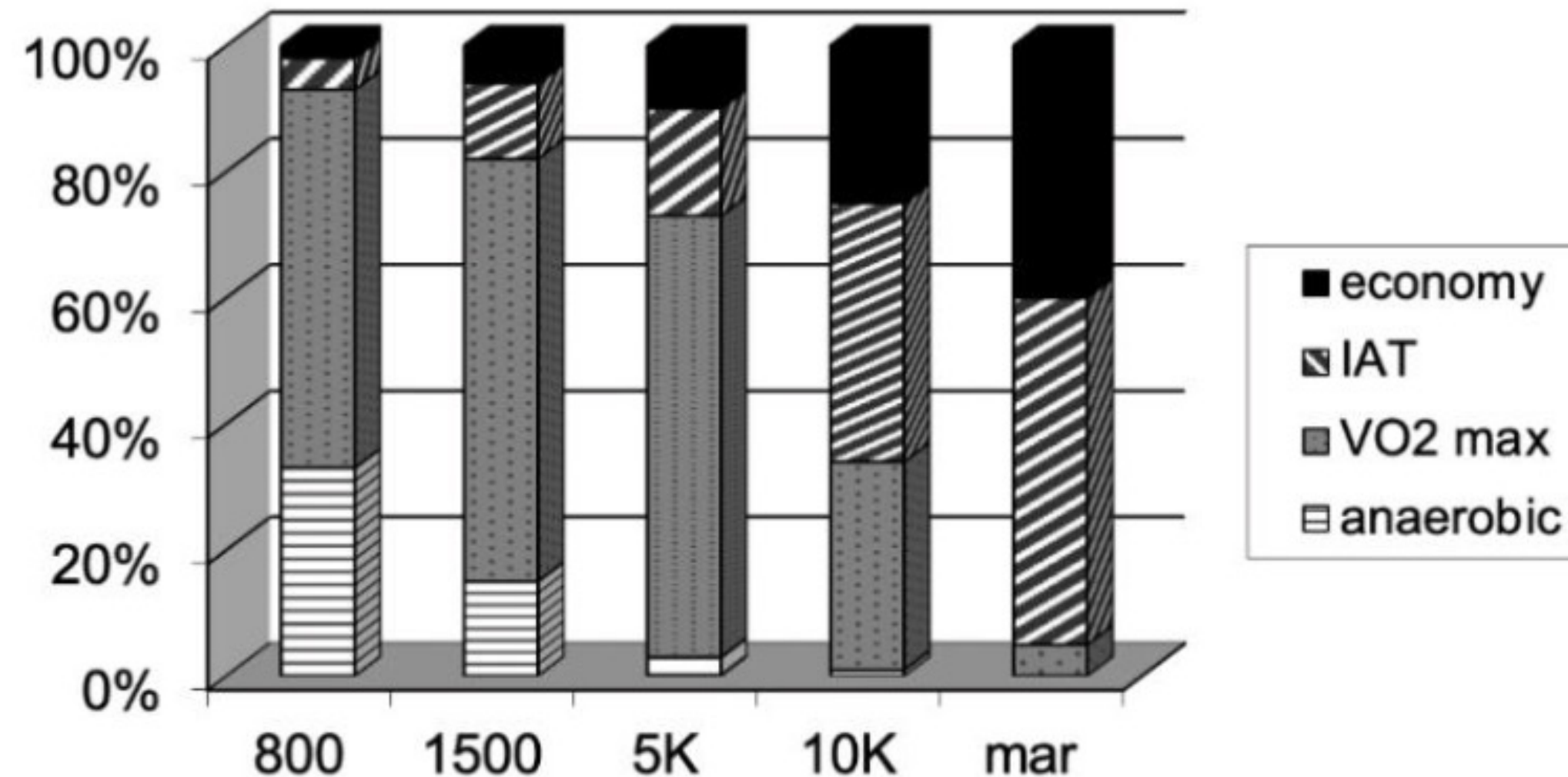
Running economy reflects how much oxygen your body uses to cover a set distance, with lower values meaning greater efficiency. We worked this out by dividing your VO_2 values from the treadmill test by your running speed, giving us the oxygen cost per kilometre.



- Your running economy improves steadily as speed increases, indicating highly efficient movement mechanics at faster / the mid-range paces
- The lowest oxygen cost (best efficiency) was observed at 18.0 km/h, meaning this is the pace at which you require the least oxygen per kilometre
- This suggests that your neuromuscular coordination and biomechanics are particularly well adapted to higher speeds, despite your ultra-endurance background
- Efficient running economy at and above threshold speeds allows you to maintain faster paces with less energy cost, which is crucial for both long climbs and sustained downhill running

Physiology of Running

Running economy becomes more vital as the distance you are running over increases. The figure below shows how running economy (amongst other factors) varies in importance dependant on the distance you are running. It is the duration of the event that matters, rather than the event itself, so obviously this would vary from person to person. This is more of a guide for performers on an elite level but adapting the specificity of your training to meet the physiological needs of your event is key to maximising performance.



Anaerobic Capacity

Blood lactate level at the end of the test can help to indicate anaerobic capacity. You reached a peak of **8.7 mmol/L**. Your peak blood lactate value represents the maximum level of anaerobic contribution reached during the test and reflects your capacity to tolerate high-intensity efforts. A high peak lactate indicates that you were able to continue running well beyond your second lactate threshold before fatigue forced termination of the test. This demonstrates strong anaerobic capacity and buffering ability, allowing you to handle surges in intensity such as steep climbs, short accelerations, and technical terrain often encountered in ultra-running events.

Pure sprint/power athletes can produce high lactate levels (>14 mmol/L), whereas more endurance-based athletes tend to have lower lactate levels even at maximum effort (8–12 mmol/L). This is due to the aerobic system being more dominant and the presence of a strong aerobic base, which you clearly have.

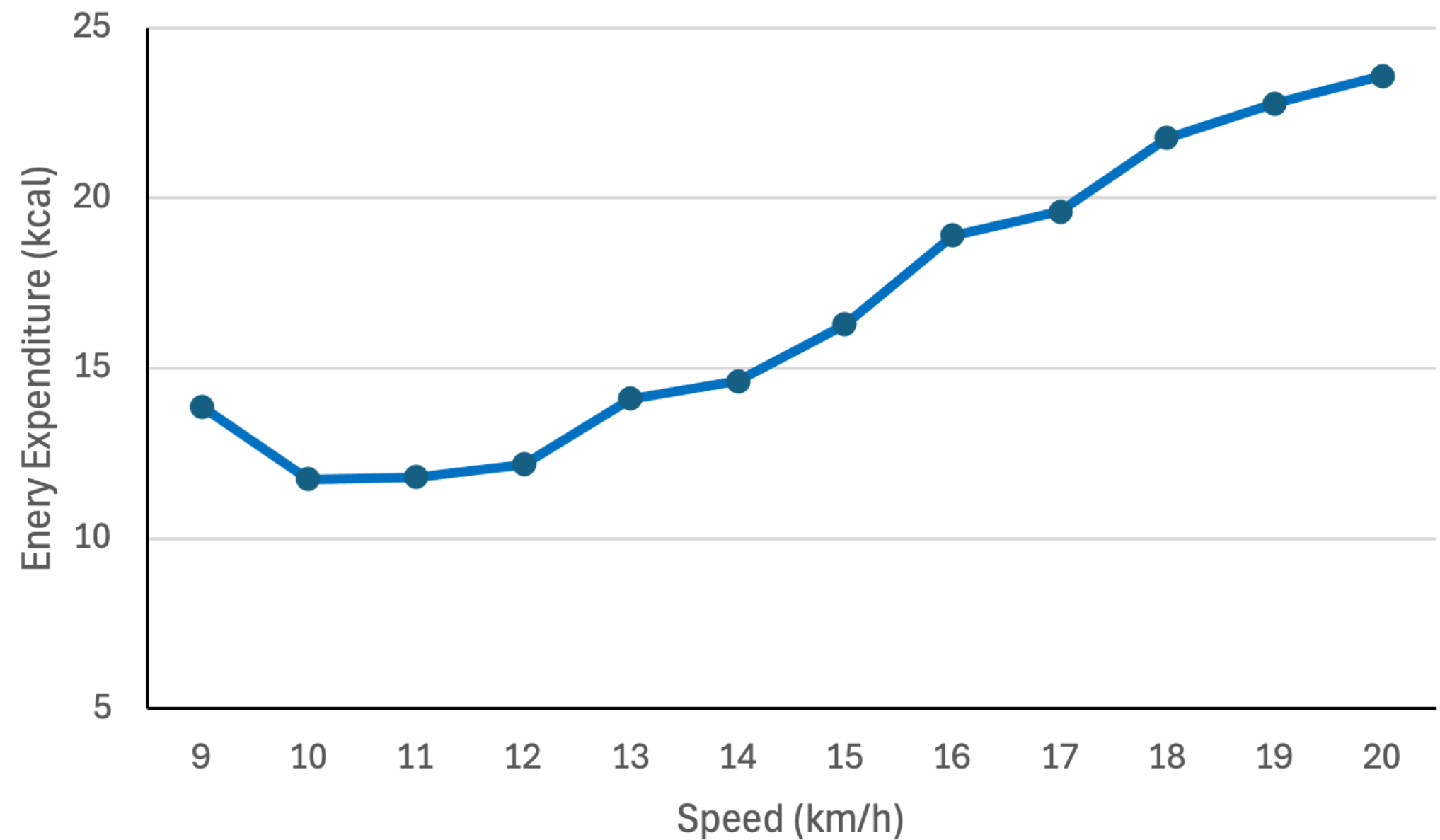
Due to their contrasting nature, it is difficult to fully develop both the aerobic and anaerobic systems simultaneously. Therefore, it's important to match your training to the specific demands of your target events.

Energy Expenditure

Energy Expenditure vs. Speed

This graph shows how much energy (kcal) you expended at different running speeds. Energy expenditure is a measure of how many calories the body burns to sustain exercise at each intensity, and it generally increases as speed (and therefore effort) goes up.

In your case, energy expenditure rises steadily from around 11 kcal at 10 km/h to 23 kcal at 20 km/h. This indicates that the body is working progressively harder and requiring more fuel as the running speed increases.

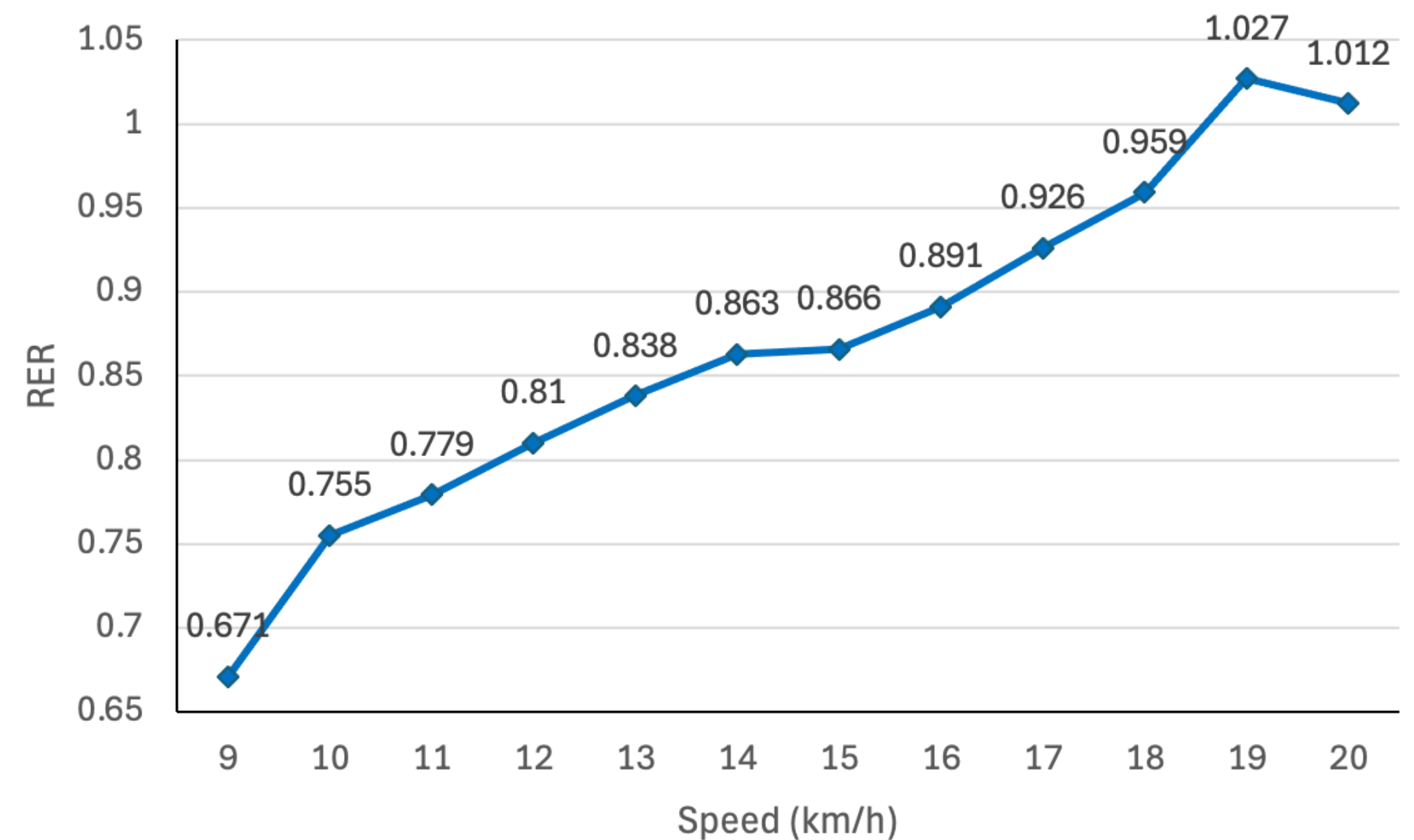


Respiratory Exchange Ratio (RER)

RER vs. Speed

RER is the ratio of carbon dioxide produced to oxygen consumed (V_{CO_2}/V_{O_2}) and indicates the type of fuel being used during exercise. An RER close to 0.7 suggests mostly fat oxidation, while an RER of 1.0 or higher reflects predominantly carbohydrate use.

Your RER values start below 0.9 all the way from 9 km/h until 17 km/h, showing a greater reliance on fat at these intensities. From 17 km/h onward, the RER values increase, reaching 1.02 at 19–20 km/h, suggesting a metabolic shift from fat to carbohydrate as the primary fuel source at higher speeds.

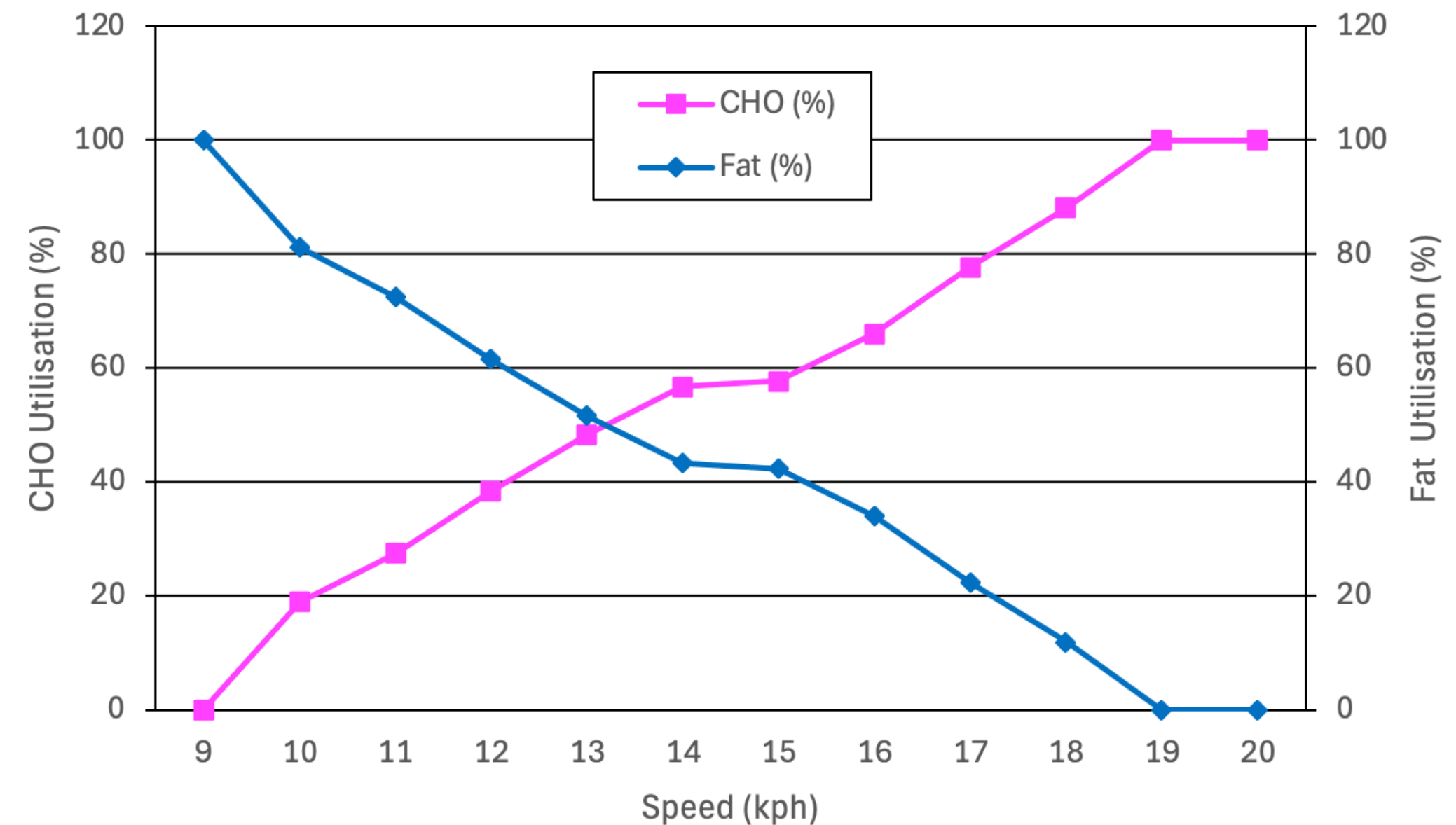


Substrate Utilisation (CHO vs. FAT)

Substrate Utilisation vs. Speed

This graph shows how your body shifts between fat and carbohydrate use as running speed increases. At lower and moderate intensities, you rely heavily on fat as a fuel source, with carbohydrate contribution increasing only as speed becomes more demanding. In your test, the crossover point (where carbohydrate becomes the dominant fuel) occurred at approximately 13 km/h, which reflects strong metabolic efficiency. This pattern aligns closely with your RER results, which remained low across a wide range of speeds, indicating efficient fat oxidation.

The aim going forward is to shift this crossover point further to the right, allowing you to rely on fat at higher speeds, which would help preserve glycogen stores and improve performance during long climbs, prolonged efforts, and ultra-distance races.

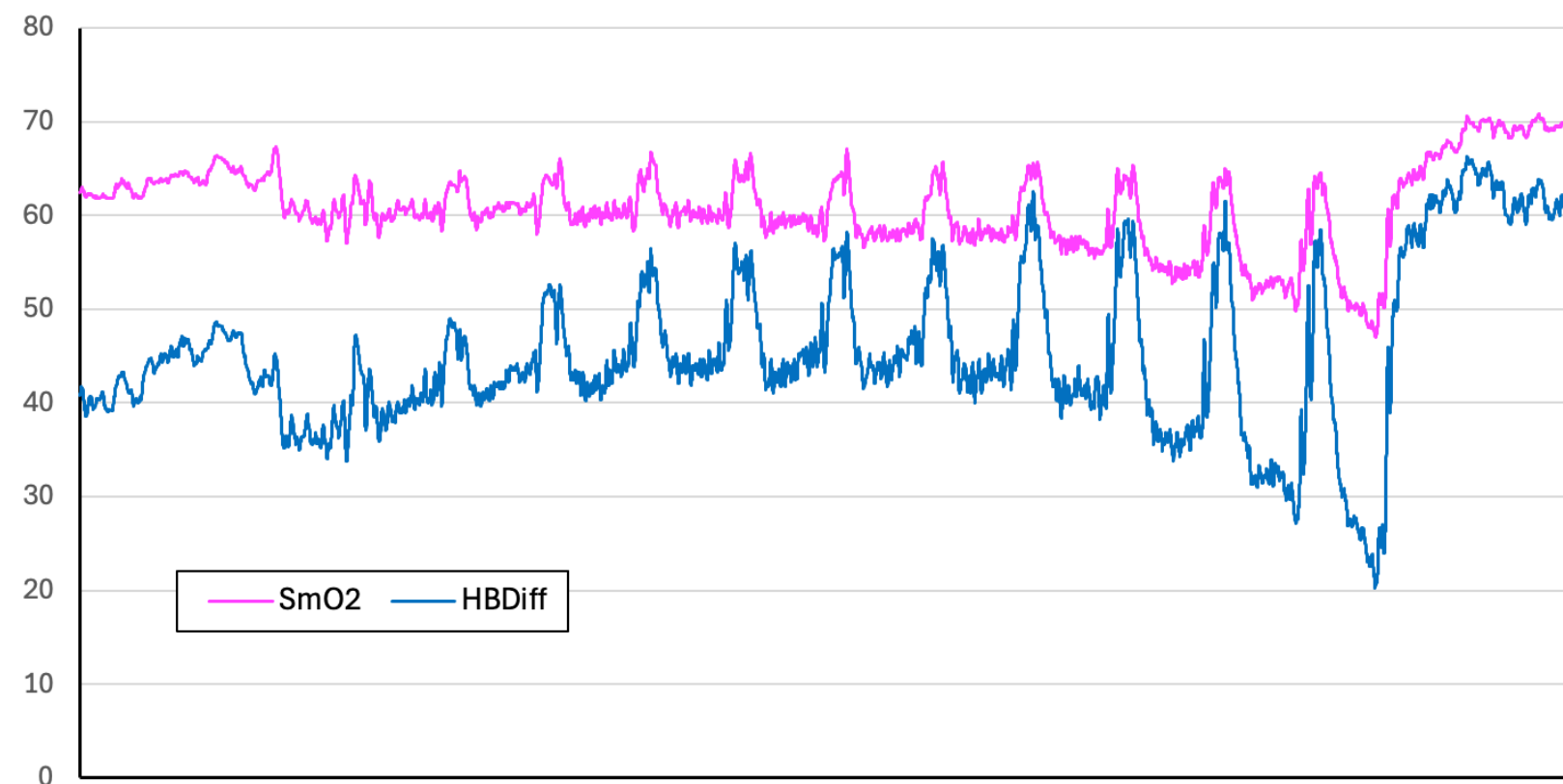


Muscle Oxygenation

This test looked at how your quadriceps muscle was using oxygen as the treadmill speed increased. We measured two things:

SmO₂ – how much oxygen is left in the muscle.

HbDiff – how much oxygen the muscle is pulling out and using.



The muscle oxygenation data shows how effectively your working muscles extract and utilise oxygen as exercise intensity increases. As speed rises, SmO₂ gradually decreases, indicating that oxygen is being used efficiently within the muscle, while HbDiff increases, reflecting a greater extraction of oxygen from the blood.

Importantly, these values suggest strong local muscular oxygen utilisation and good recovery capacity between stages. The absence of an abrupt drop in muscle oxygenation indicates that fatigue during the test was more likely driven by cardiovascular and metabolic limits rather than a failure of the muscle itself. This suggests that your muscles are well adapted to sustained work and recover efficiently, supporting repeated climbs and prolonged efforts in ultra-distance events.

Summary & Next Steps

Strengths

- Exceptionally high aerobic fitness, with LT1 and LT2 occurring at very fast running speeds
- Very low heart rate and lactate levels in the early stages of the test, indicating minimal physiological stress and outstanding aerobic efficiency
- Excellent running economy, particularly at higher speeds, showing strong biomechanics and neuromuscular coordination
- Highly efficient substrate utilisation, with a strong reliance on fat at moderate intensities

Areas to Improve

- Increasing the gap between LT1 and LT2 to allow a wider range of sustainable “comfortably hard” speeds
- Developing greater durability at tempo and upper-threshold intensities to support faster climbing and descending
- Improving tolerance to sustained efforts just below LT2 to further delay fatigue during long races.

Summary & Next Steps

Next Steps

This is without question the most impressive set of physiological data I have seen, and it is extremely rare to see an athlete fully max out the treadmill... next time we may need to start you at an even higher speed! Aerobically, there is very little to fault; your low heart rate and low lactate levels early in the test show that your body produces lactate slowly and clears it efficiently, meaning you can run fast while staying relaxed. To continue progressing, the focus should be on targeted tempo and sub-threshold work to increase the gap between LT1 and LT2, improving speed sustainability on both climbs and descents.

Based on your physiology, and assuming optimal conditions and race execution, the data suggests a best-case potential of approximately a **2:38 marathon** and a **1:12 half marathon**. Your strong fat utilisation is likely supported by your fasting approach; by gradually pushing this crossover point to higher speeds through aerobic volume and controlled intensity work, you can further improve endurance efficiency and delay carbohydrate reliance during long events.



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