

RUNNING ECONOMY REPORT · 2024

Running *Economy*

The energy cost of running at each of your target paces. Lower numbers mean better economy. Tracked over time, this is one of the clearest measures of training adaptation.

ATHLETE	SPORT / DISCIPLINE	TEST DATE	TEST PROTOCOL
Sample Runner	Triathlon	3 July 2024	Step ramp · 3 min · stages to volitional exhaustion

SUMMARY

Headline economy

Race-pace economy VO ₂ AT YOUR HARDEST MEASURED STAGE	PACE 12.9 kph	VO₂ 59.5 mL/kg/min	HEART RATE 198 bpm RER — · cost reported per stage
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EASY PACE 2.7 kph VO ₂ 17.5 mL/kg/min · 95 bpm	STEADY PACE 8.0 kph VO ₂ 35.0 mL/kg/min · 169 bpm	MAX HEART RATE (TEST) 198 bpm Highest HR recorded during the three submax stages.
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- 01** **VO₂ Max: 59.5 mL/kg/min (Superior band).**
Reference comparison drawn from ACSM 11th ed / FRIEND registry female norms, 30–39 age band.
- 02** **LT2: 10 kph (186 bpm).**
LT2 occurred at 78% of VO₂ Max. Below typical trained-population values; threshold-targeted training is indicated.
- 03** **Training zones — HR max 198 bpm.**
Z1 119–148 bpm
Z2 148–172 bpm
Z3 172–188 bpm
Z4 188–198 bpm
Bands derived from HR max; aerobic base in Z1.
- 04** **Recommended re-test interval: 10–12 weeks.**
A follow-up incremental test in this window allows the change in LT1/LT2 power and VO₂ Max to be quantified.

SECTION 01

What "economy" means

Running economy is the oxygen cost of running at a given pace. Two athletes can have the same $\dot{V}O_2$ max but very different running economies — and the more economical one will usually be the faster racer over distance events. Improving economy is a slow, durable process driven by miles, drills, strength work and time at race pace.

LAB	ERGOMETER	PROTOCOL
TRB 2.30 – Treadmill Suite	h/p/cosmos Pulsar 3p Treadmill	Step ramp · 3 min · stages to volitional exhaustion

1.1 Your data at each pace

Each row below is a four-minute sub-maximal stage at a controlled pace. $\dot{V}O_2$ at the end of each stage is the headline number. HR and RER are reported alongside so you can see how each system is responding.

STAGE	PACE	$\dot{V}O_2$ (ML/KG/MIN)	HR (BPM)	RER	$\dot{V}E$ (L/MIN)
1	2.7 kph	17.5	95	–	–
2	4.8 kph	21.0	128	–	–
3	6.4 kph	31.5	152	–	–
4	8.0 kph	35.0	169	–	–
5	9.7 kph	42.0	181	–	–
6	11.3 kph	52.5	192	–	–
7	12.9 kph	59.5	198	–	–

What good looks like. Most trained distance runners sit in the 180–220 mL/kg/km range across their typical training paces. Lower is better. The number is most useful when compared to your previous tests — improvements are often only a few percent at a time, but compound over a season.

SECTION 02

Pacing & Heart Rate

Use the heart rates you saw at each stage to direct your training paces. Heart-rate zones derived from your test maximum of **198 bpm** are shown below; the pace columns above sit naturally inside Zones 1, 2 and 3.

Z1 — Aerobic (Low)	60–75%	119–148 bpm	<i>30 min – 3 hours</i>
Z2 — Aerobic (High)	75–87%	148–172 bpm	<i>8 – 60 minutes</i>
Z3 — Aerobic Maximum	87–95%	172–188 bpm	<i>30 sec – 3 minutes</i>
Z4 — Anaerobic	95–100%	188–198 bpm	<i>10 – 60 seconds</i>

2.1 Putting your economy data to work

- **Easy days.** Run by HR in Zone 1. Your easy-pace economy here is the baseline you'll compare against in re-tests.
- **Steady / progression runs.** Use your steady-pace stage's HR as the cap — don't drift above it on volume days.
- **Hard sessions.** Use your hardest-stage pace as the target intensity for tempo / threshold work, with HR as the verification.
- **Re-test in 11 September – 25 September 2024.** A repeat economy test will show whether $\dot{V}O_2$ at the same paces has come down — the clearest signal that the work is paying off.

Reminder. Economy is most useful as a within-athlete tracking metric. Year-on-year improvements of 1–3% are common with consistent training; bigger jumps usually reflect a change in shoes, terrain or testing protocol rather than a step-change in physiology.

CLOSING

Thank you for visiting our laboratory.

Please get in touch if you have any questions about your data, would like a more detailed walk-through of any section, or would like to book a follow-up test later in the year. We're glad to chat.

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Lead Sport Scientist · Performance Testing

Test confirmed clean and within QA bounds.

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DOCUMENT

Performance Testing Report —
generated 29 May 2026. Internal
reference: PTR-24-07-SAMPLE.

CONFIDENTIALITY

This report contains personal
performance data. Please do
not share without the named
athlete's consent.

RE-TEST

Recommended re-test window: **11
September – 25 September 2024.**
Book at testing@ljmu.ac.uk.