

Appendix A: Field Testing and Benchmark Protocols

The purpose of this appendix is to make the book's testing ideas easy to use without rereading the full benchmark, zone, readiness, and case-study chapters.

These protocols are not medical tests and they are not universal prescriptions. They are practical coaching tools. Use them to answer a specific question, standardize the conditions, and compare the athlete with their own previous results.

General Testing Rules

Use the same protocol each time. A useful test is repeatable before it is impressive.

Before any benchmark, record:

- Date, time, location, and environmental conditions.
- Sport, route, course, pool, trainer, treadmill, or ergometer used.
- Equipment, calibration, tire pressure, shoes, suit, or relevant setup details.
- Sleep, soreness, stress, nutrition, illness, travel, and motivation.
- Recent training load and whether the athlete is fresh, normal, or carrying fatigue.

Do not compare tests done under meaningfully different conditions as if they are the same test. Heat, altitude, wind, surface, pool length, equipment, and fatigue state can all change the result.

When to Test

Test when the result will change a decision.

Good reasons to test include:

- Establishing an athlete profile at the beginning of a program.
- Setting or checking training zones.
- Confirming progress during a general preparation block.
- Identifying a limiter before a specific preparation block.
- Checking whether a plateau is real or just training noise.
- Reviewing whether the athlete is ready for a higher training load or a more specific race focus.

Poor reasons to test include:

- Chasing reassurance every week.
- Testing because the athlete is anxious.
- Testing when illness, underfueling, poor sleep, or acute life stress makes the result hard to interpret.
- Replacing consistent training with constant measurement.

Aerobic Efficiency Benchmark

Question answered: Is the athlete producing more pace or power at the same easy-to-moderate aerobic cost?

Best used for: Base fitness, durability, aerobic economy, and early warning signs of fatigue.

Protocol:

1. Warm up for 15-20 minutes very easily.

2. Complete 20-40 minutes at a fixed heart rate or fixed low-zone intensity.
3. Record average pace or power, heart rate, cadence, perceived exertion, and environmental conditions.
4. Optional: split the effort into two equal halves and compare pace/power drift.

Interpretation:

- Better pace or power at the same heart rate usually indicates improved aerobic efficiency.
- Large heart-rate drift at a fixed pace or power may indicate heat stress, poor fueling, dehydration, fatigue, or insufficient aerobic durability.
- A worse result on one day is not a crisis. Look for repeated changes across similar conditions.

Aerobic Threshold Field Check

Question answered: Where does easy aerobic work begin to become meaningfully more costly?

Best used for: Setting the upper end of easy training and checking whether base work is moving in the right direction.

Protocol:

1. Warm up for 15-20 minutes.
2. Complete a step test of 4-6 stages, each lasting 5-10 minutes.
3. Increase pace or power slightly at each stage.
4. Record heart rate, pace or power, perceived exertion, breathing, and optional lactate.
5. If lactate is available, take a sample near the end of each stage.

Interpretation:

- Aerobic threshold is often near the first clear rise in lactate, ventilation, or perceived breathing effort.
- In the field, treat this as a range rather than a single exact number.
- If the athlete cannot hold the lower stages comfortably, the test is too hard or the athlete is not ready to test.

Lactate Step Test

Question answered: How does the athlete's lactate response change as intensity rises?

Best used for: Zone setting, metabolic profiling, identifying aerobic and anaerobic threshold regions, and tracking changes in fuel use and clearance.

Protocol:

1. Use a standardized ergometer, treadmill, pool set, track, or course.
2. Warm up thoroughly.
3. Complete 5-minute stages, increasing power, pace, or speed each stage.
4. Take lactate in the final minute or immediately after each stage.
5. Record heart rate, lactate, pace or power, RPE, and notes on breathing.
6. Continue until the athlete has clearly crossed the relevant threshold region or cannot continue with good form.

Interpretation:

- Look at the shape of the curve, not only one value.
- A rightward shift at the same lactate usually suggests improved metabolic fitness.
- A lower lactate at the same power or pace is usually positive if performance and subjective state also support it.

- Lactate readings are sensitive to sampling technique, device error, food intake, fatigue, and warm-up.

Critical Power or Critical Pace Profile

Question answered: What does the athlete's power-duration or pace-duration profile look like?

Best used for: Identifying strengths, setting race targets, and seeing whether the athlete is more speed-oriented, threshold-oriented, or durability-oriented.

Protocol:

1. Choose two to four test durations that match the sport and athlete level.
2. Common options include 3-5 minutes, 12-20 minutes, and 30-60 minutes.
3. Test on separate days or with enough recovery between efforts to preserve quality.
4. Standardize warm-up and conditions.
5. Record best average power, pace, heart rate, RPE, and execution notes.

Interpretation:

- Short-duration strength with poor long-duration performance may indicate a need for aerobic development or durability.
- Strong long-duration performance with weak short-duration power may indicate a need for speed, strength, or VO2max development.
- Use the profile to guide training emphasis, not to label the athlete permanently.

Durability Benchmark

Question answered: Does the athlete maintain mechanics, pace, power, and energy late in long work?

Best used for: Long-course triathlon, marathon, ultra, long cycling events, and masters athletes.

Protocol:

1. Choose a long session that is already appropriate for the athlete's level.
2. Hold the early portion deliberately controlled.
3. Include a fixed benchmark segment late in the session.
4. Compare late-session pace or power, heart rate, RPE, form, and fueling tolerance with earlier segments.

Interpretation:

- If late output falls while heart rate and effort rise, durability may be limiting.
- If the athlete fades despite good pacing, check fueling, heat, musculoskeletal resilience, and total training load.
- Durability improves slowly. Do not use one long session to force a conclusion.

Basic Speed Benchmark

Question answered: Can the athlete still move quickly and cleanly?

Best used for: Maintaining neuromuscular qualities during base training and identifying whether the athlete is becoming one-paced.

Protocol:

1. Warm up thoroughly.
2. Complete short efforts with full recovery.

3. Run examples: relaxed 100-200 m efforts or short hill sprints.
4. Bike examples: 6-10 second high-power sprints with long recovery.
5. Swim examples: 25-50 m fast but technically clean repetitions.

Interpretation:

- The benchmark is successful when speed is produced with control.
- Stop before form breaks down.
- Do not turn basic speed work into glycolytic conditioning.

Strength Benchmark

Question answered: Is the athlete maintaining enough strength to support performance and durability?

Best used for: General preparation, return from injury, masters athletes, and athletes with musculoskeletal limiters.

Protocol:

1. Choose a small set of repeatable movements.
2. Use technically controlled efforts rather than all-out maximal lifting.
3. Common options include deadlift or trap-bar deadlift, squat pattern, single-leg strength, calf raise endurance, pull, push, and trunk endurance.
4. Record load, reps, form quality, side-to-side differences, and soreness response.

Interpretation:

- The goal is useful strength, not gym performance for its own sake.
- If strength rises while endurance work suffers, the balance is wrong.
- If endurance volume rises while strength and tissue tolerance fall, injury risk may be increasing.

Body Composition and Frame Profile

Question answered: Does the athlete's body structure support the event demands and health goals?

Best used for: Athlete profiling, event selection, long-term development, health restoration, and understanding changes across a season.

Protocol:

1. Use a consistent method: DEXA, skinfolds, circumference measures, scale weight, or a combination.
2. Record body mass, fat mass estimate, lean mass estimate, skeletal muscle estimate if available, and relevant girths.
3. Record training phase, nutrition state, hydration, menstrual status if relevant, and recent illness or travel.

Interpretation:

- Body composition is context, not a verdict.
- Performance, health, energy availability, menstrual function, bone health, and mood matter more than a single number.
- Changes should support the athlete's long-term development, not undermine it.

Readiness Benchmark

Question answered: What daily signals predict whether the athlete is ready to load, maintain, or recover?

Best used for: Athletes with enough training history to compare current state with their own normal pattern.

Protocol:

1. Track morning HRV, resting heart rate, sleep, fatigue, soreness, mood, stress, and motivation.
2. Track training load, intensity, and how the session felt.
3. Use 7-day trends to reduce noise and 60-day trends to define the athlete's normal range.
4. Review which signals best predict poor sessions, failed sessions, or strong sessions for that athlete.

Interpretation:

- Readiness is readiness for a specific type of work, not a generic green or red light.
- Low readiness usually argues against intensity or very high load.
- Easy aerobic work may still be appropriate when high-intensity work is not.
- The athlete's individual history should outrank population averages.

Testing Review Checklist

After each test, answer:

- What was the question?
- Was the protocol standardized enough to trust?
- Was the athlete in a normal state?
- What changed from the last comparable test?
- Is the change larger than normal noise?
- Does the result agree with training observations?
- What decision changes because of this result?

If no decision changes, the test may still be interesting, but it is not yet useful.