



Performance Measured

THE PERFORMANCE BENCHMARKS OF ELITE ATHLETES

WWW.LIFT3.COM.AU



Introduction

Sports Performance is a dichotomy made up of Sports Skill and Athleticism. Elite Athletes have to have both in abundance. High Levels of one without the other will very rarely make an elite athlete.

Whilst Sports Skill is very subjective, Athleticism can be broken down into objective measurements that can be measured by Performance Testing.

Performance Testing in sport has been around for years, with basic conditioning tests such as the feared Bronco, all the way to the utilisation of advanced tech from companies such as Vald Performance to give clear objective data on each athlete.

At Lift3 we've been working with available technology to test our clients and athletes and give us clear data to make more informed coaching decisions.

This has been transformative for the athletes as it allows them to get a snapshot of their performance today, see their progress and plan for the future.

However, we wanted to do more, to give the athletes context on where their performance actually sits beyond the confines of just the available Lift3 data pool. We wanted to give them the benchmarks of the Elite of the Elite.

This document is the culmination of what we have identified as benchmarks in various areas of performance so that you as an athlete have a target to aim for.

To be honest, we're not even sure if there is anyone who can accomplish every benchmark, however if you could achieve or at least get close to (and have significant sports skills alongside) then you would likely be one of the absolute elite in your field.

Now, should you test yourself or come to us for testing and not be close to a benchmark, don't stress, it's just data and allows you and your coaches to identify where work is required to help bring up your athleticism.

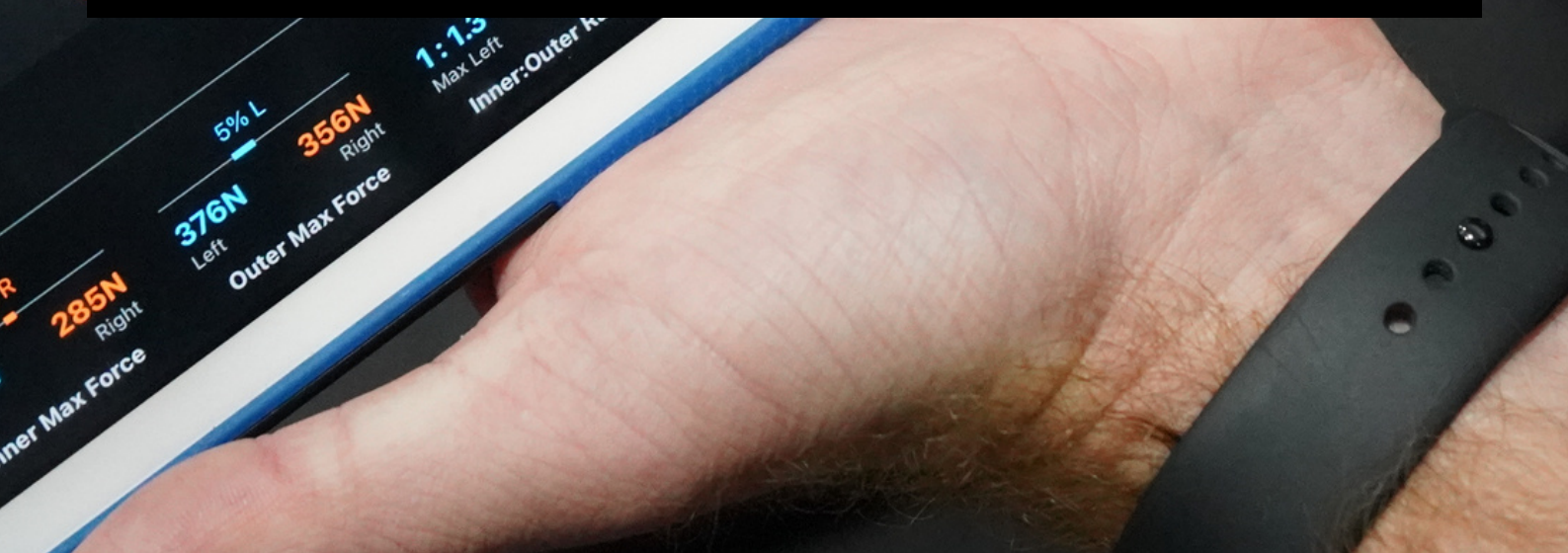
CORE AREAS

To start off our work we identified 5 key areas that we wanted to assess and group our key metrics.

These were;

- Speed & Agility
- Power
- Strength
- Joint Health
- Conditioning.

Across these areas we then worked on the key metrics that we felt would have the most carryover/impact on an individual's sport, whether they are on a field, court or any where they participate in sport.





01 — Speed & Agility

Without physical movement at speed in most sports you will struggle. We broke Speed & Agility into three areas, Acceleration, Max Velocity and Change of Direction.

Acceleration is critical as it is how you are able to find space and/or separation from defenders or close space on attackers. The stronger those first few steps are the greater the space available increases. Max Velocity is once you're up and running how fast you can actually go, it's what creates the game winning moments where you dramatically chase down an attacker from the other side of the pitch, or take an intercept to the try/touch zone.

Change of Direction is a combination of how well you can decelerate, move your body around and then accelerate back out. It's again what enables you to create more space to control your game.

02 — Strength

Strength is your muscles ability to generate force, the bigger the force, the stronger you are. We wanted to look at your total ability as well as specific muscles that are critical in athletic endeavours. Strength is going to make a big difference particularly in the initial acceleration phase of sprinting where the ground contact time is longer.



03 — Power

Power is your ability to express your strength at speed. The faster you can get your muscles to engage to their max strength then the more powerful you are. This can prove critical in areas such as acceleration where projecting yourself further requires more power.

04 — Joint Health

Looking at certain joints and the muscles around them we can get indicators for the health and balance of the joint, strength in this area also then affects your total strength and power in those joints.

05 — Conditioning

Apart from Sprinting most sports last longer than 10 seconds so being able to perform at high levels for longer is a great advantage. Also we know neurologically that fatigue significantly affects decision making abilities. So if we are less fatigued we can make better decisions for longer.



BENCHMARKS

Speed & Agility

Max Velocity - 10.8 m/s

The unit we measure maximum velocity in is Metres per Second.

There are a few ways to measure Max Velocity, one is via a GPS unit, the other way is to record a flying 10 metre interval (less accurate = Stopwatch, more accurate = Laser timing gates).

A GPS unit will also generally have a max velocity measure.

For those using a stopwatch or timing gates the calculation is very simple. Distance/Time in Seconds so if you covered the 10 metres in 1.2 seconds the calculator would look like $(10/1.2)=8.33$ Metres per Second

Some examples of people getting close to these speeds, or exceeding them are;

Soccer - Antonion Rudiger - Real Madrid - 10.19 m/s

Rugby League - Josh Addo-Carr - Bulldogs - 10.75 m/s

Rugby Union - Christian Wade - 11.2 m/s

American Football - Parris Campbell - New York Giants - 9.87m/s

As a standalone aside, the Fastest man on the planet, Usain Bolts max velocity was 12.2 metres per second.

For the Females, Marie-Josée Ta Lou in the 2017 olympics 100m final achieved the highest max velocity of 10.87 metres per second

[Click here to learn how to test your max velocity at home](#)

Acceleration

0-10 Metre Sprint = below 1.7 seconds.

From a standing start at the line sprint through 10 metres. While a stopwatch could be used, timing gates are your friend here as it will take out reaction times, starting when the line is crossed and finishing when the 10 metres is crossed.

As a comparison to max velocity this is only 5.56m/s but the difference can be huge in regards to distance gained. A .1 second difference in the first ten equates to around 30 centimetres per second meaning that in just a 3 second race to a ball you would be almost a metre closer, giving you time and space to control the game.

When you look at the top 7 fastest 100m sprints in history and focus on the 0-10m split taking out their reaction time the average is around 1.7 seconds for the initial split.

[Click here to learn how to test your acceleration at home](#)



Change of Direction

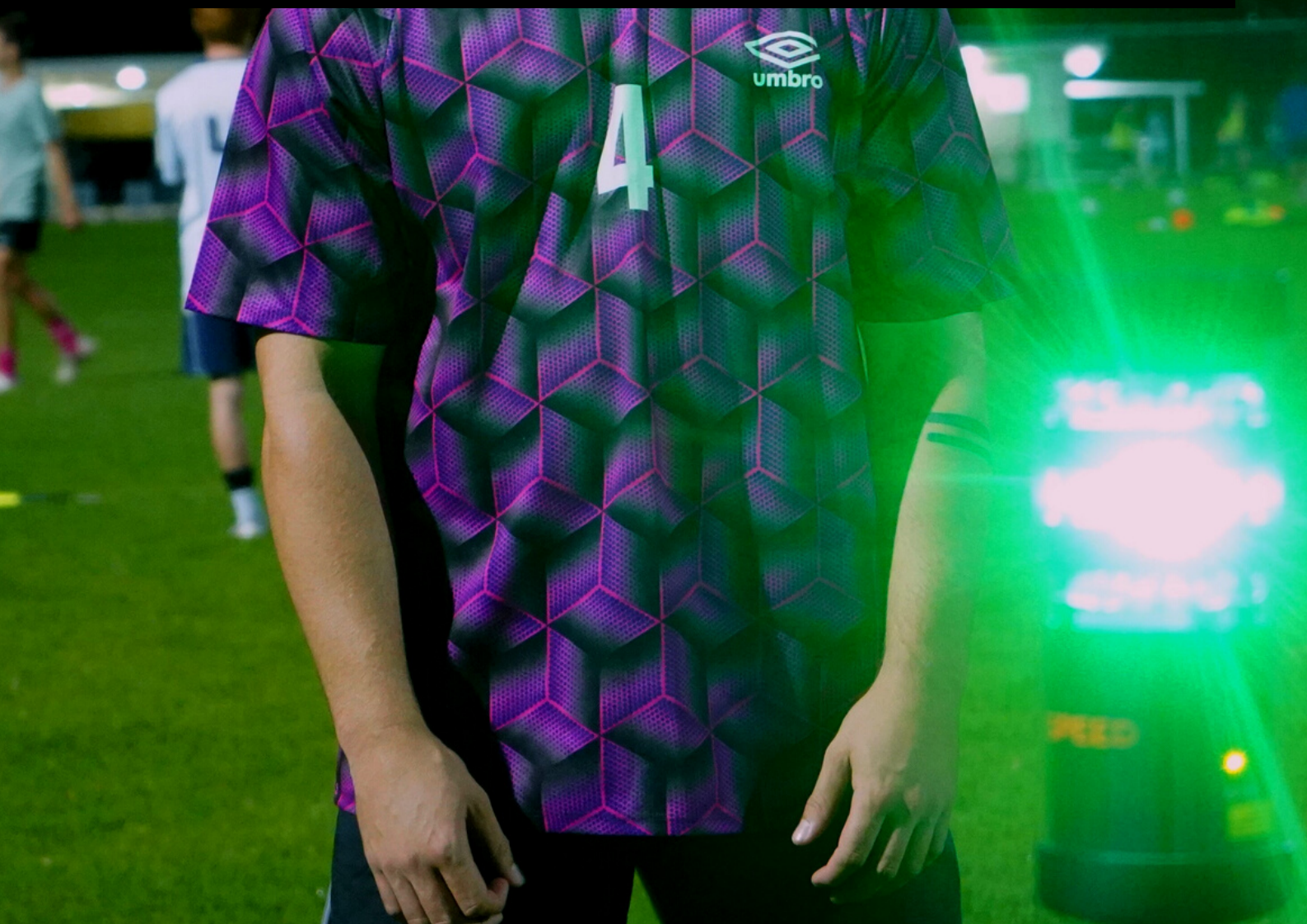
Change of Direction Cost = below .7 seconds

The two tests you'll need to calculate your COD Cost is a 20 metre sprint and a 5-10-5 agility test.

You then take your 5-10-5 agility test time, subtract the 20 metre sprint time and divide by 2 to get your COD cost. For instance a 3 second 20m and a 5 second 5-10-5 gives a 1 second COD cost $((5-3)/2)=1$

What we are looking to understand is how well you can decelerate at speed, turn your body 180 degrees and project out again. The faster you can do this the better you will create space in a similar fashion to the acceleration metric.

[Click here to learn how to test your change of direction at home](#)



Strength

Overall Strength -- Iso Mid Thigh Pull = 50+N/Kg of Body Weight

When looking at Strength Testing it's very easy to look at the traditional gym based movements like a squat or deadlift, however as most strength sport athletes can tell you, how you perform on any given day is a very subjective thing. You may initiate the lift in the wrong position or get out of position during the lift, the skill of the lift itself is important.

For data collection the more objective we can make it the better. For this reason we utilise the Vald Force Decks and perform an Isometric Mid Thigh Pull.

Pulling on a bar in a fixed position as hard as possible allows us to exert maximal force with minimal skill or coaching required.

Generally there are two main metrics being utilised in the test, Peak Vertical Force and Relative Force both being measured. For our performance metric we are using Relative Force, this is how many Newtons of force you can generate per KG of bodyweight (Total Newtons/Bodyweight). This means we are able to assess how effectively an individual uses their mass to produce force.

Hamstring Strength Nordic Curl = 100%+ of Bodyweight

To measure without the wonders of a nordboard, the simplest way of measuring your hamstring strength would be to perform a nordic curl. The benchmark here would be gently touch your nose to the ground and pulling yourself back up to your starting position utilising just your hamstrings.

If you have a Nordboard then when performing a Nordic, you will get a left and right measurement in Newtons, you simply add the two together and divide by 10.197 to get the KG, this can then be applied against your bodyweight for a percentage score.

Your eccentric hamstring strength is a major factor in reducing hamstring related injuries especially in the knee region such as ACL injuries. Focusing on Hamstring strength in your training will reap significant dividends.

[Click here to learn how to test your hamstring strength at home](#)



Power

Jumping Power

Countermovement Jump - 75w/kg of Bodyweight Concentric Peak Power

A countermovement jump is performed on force plates with hands on hips, a quick dip and then jumping as high as possible. With this we are looking at the ability to generate force very quickly projecting up as high as possible. Rather than looking at Jump Height which can be heavily influenced by body height/weight we use the Relative Concentric Peak Power which is generated in the phase from the bottom of the dip all the way through extension with the feet leaving the floor.

Utilising Vald Performances Normative Data Sets across multiple sports we found that the 95th percentile in most sports was between 67w/kg up to 83w/kg

Ground Contact Time

Drop Jump - <250ms

A Drop Jump is performed by stepping off a box onto the ground or force plates and jumping back up as quickly as possible.

The ability to land, absorb the force and push back up into another jump is critical in sprinting and changing direction so our ground contact time is the logical measure. The shorter the contact time the quicker you are able to reverse the force into the ground and project out.



Joint Health

Hip Adduction/Abduction

Hip Adduction/Abduction 45 Degrees Test - 100%+ of Bodyweight

For this test you can either use a handheld dynamometer (less accurate) or as we prefer, a Vald Force Frame (more accurate), lying on your back with your feet on the ground and knees in the air and your hips creasing at 45 degrees, squeeze your knees together and apart for a few seconds each way.

For this there are a variety of considerations, Adduction:Abduction Ratio, Left/Right difference and then as well as overall strength. We have found that a relatively equal Left/Right difference and 1:1 ratio for Adduction and Abduction are great indicators of health, but we also found that strength is the better indicator.

To gauge our strength we're going to use a similar equation to the Nordic, adding the Left Adduction and Abduction together then adding the Right Leg Adduction and Abduction together before dividing by two and then finally dividing by 10.197 to get a comparable number to our bodyweight.

Ideally we expect to see in elite Athletes a higher than bodyweight strength number along with close to balanced ratios.

Hamstring Balance

Nordic Curl - <5% imbalance

Using the Nordic Curl we did earlier we also want to see less than 5% difference between our Left and Right hamstring curl, larger than that and interventions would be advised to bring the weaker leg up to the stronger legs. Again as we are looking at Elite Athletes, we'd expect to see more balance in these numbers.



Conditioning

Maximal Aerobic Speed Testing

M.A.S Score - 4.8+

Various sports have developed conditioning drills that have a relevance to their sporting requirements, all though are used to calculate a M.A.S score. The higher the score, the faster you were able to go for longer.

For exceptional specific context, Eliud Kipchoge world record Marathon average speed would give an M.A.S score of 5.8

Below are a few of the most common tests we use and the time you would need to aim for to achieve a 4.8 M.A.S score

Bronco -Over 100kg = 4 minutes 39 seconds or less
-Under 100kg - = 4 Minutes 30 seconds or less

2km Time Trial = 6 minutes 57 seconds

CONCLUSION

Through looking at these benchmarks we should now have a complete picture of the physical attributes that make up an elite athlete. As previously stated, there are other factors such as hand to eye coordination, game awareness and other attributes that will play into your chosen sport. However if you're pushing close to 100% in all of these, you have a distinct advantage.


At Lift3 we take these benchmarks and then turn an individual athlete's results into a % of the benchmark so that we can quickly and easily identify areas for improvement that will carry over to their in sport performance.

If you're interested in testing yourself then give it a go, of course specialist equipment may be needed for some tests, but it will help you identify where you can improve.

Alternatively, you can get in touch with the Lift3 team and we can put you through our performance testing suite that includes all of these tests and a few more and really give you the most accurate data possible.



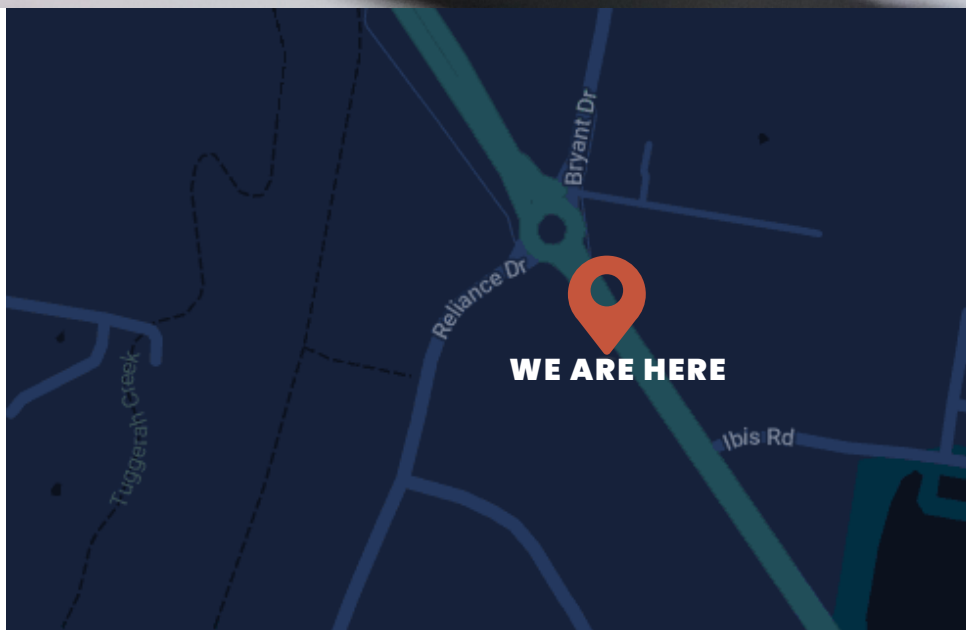
CONTACT US

 0413 614 322

 info@lift3.com.au

[@lift3centralcoast](#)

**D/2 Reliance Dr
Tuggerah, NSW**



WWW.LIFT3.COM.AU