

DO YOU KNOW Your Numbers

Smash Factor

1.52

Swing Plane

47.5

Club Path

4.0

Launch Angle

16.1

Face To Path

-1.4

Spin Rate

2210

Carry

257.8



CLUB DATA

Club Speed

The rate the club is traveling at the moment of impact with the ball is the clubhead speed, measured in MPH. This is a key factor in determining how far the ball will travel.

Attack Angle

The angle at which the clubhead strikes the ball, measuring how much a golfer is hitting up or down on the ball at impact.

Club Path

The direction of the clubhead sweet spot relative to the radar's target line. Club Path is influenced by a player's angle of attack, horizontal swing plane and vertical swing plane.

Dynamic Loft

Loft of the club at separation with the ball. Dynamic loft influences the launch of the ball, and is a result of the static loft of the club, shaft bend at impact, angle of attack into the ball, and the amount of forward press a player has at impact.

Face Angle

Club face angle relative to the radar's target line, measured at the moment of separation with the ball. Face angle will influence the direction in which the ball starts relative to the radar's target line.

Spin Loft

A contributing factor to ball spin resulting from the loft on the club face at impact, which is defined by the difference between the angle of attack and dynamic loft of the club at impact.

Face to Path

Club face angle relative to the club path, measured at the moment of separation with the ball. Face to path will tilt the spin axis if impact occurs on the club face center.

Swing Plane

47.5

Swing Plane

The angle in relation to the ground on which the club shaft travels around the golfer's body.

Swing Direction

The swing direction is how far left or right of the target line the 'direction of the swing' is aimed at the bottom of the swing arc.

LAUNCH DATA

Ball Speed

The velocity at which the golf ball leaves the clubface after being struck, measured in MPH.

Smash Factor

The measurement of ball speed divided by the clubhead speed at impact. This statistic shows how efficiently energy is transferred from the club to the ball.

Launch Angle

The initial angle of the ball's ascent immediately after impact, measured in degrees. Factors affecting launch angle include swing speed, attack angle, and the loft of the club.

Launch Direction

The direction of the ball as it leaves the clubface. The initial launch direction is controlled by the clubface rather than the club's path.

Spin Rate

Number of rotations per minute of the ball at launch. A higher spin loft and higher friction will increase the spin rate of the ball.

Spin Axis

Amount of axis tilt on the ball to determine the amount of curvature in the flight of the ball. The greater the tilt, the more the ball will curve.

FLIGHT DATA

Carry

The measurement of the distance a ball travels in the air from where it is struck to where it lands.

Height

Maximum height of the ball trajectory.

Total

The measurement of the total distance from where it is struck to the final position of the ball on the ground.

Side

The exact distance the ball finished right or left of the intended target.

Landing Angle

41.4

Landing Angle

The angle at which the ball lands on the ground. The higher the descent angle, the less the ball will move forward after hitting the ground.

Hang Time

Also known as 'flight time,' the amount of time the ball spends in the air from the time of impact to the initial ground impact, measured in seconds.

Golf: A Numbers Game

Ball Speed
152.3



By Woody Lashen and Pete Makowski

Knowing your numbers can help your game immensely. Understanding what your patterns are can help you with your game management, equipment needs and why your pro is directing you to make a change in your swing. But be careful – you must look at the whole picture to understand your flight pattern.

In this article we will explore many different numbers that will help you understand what occurred with each swing. If you are getting custom fit for clubs or taking lessons, these numbers will provide the best way for a custom fitter or pro to improve your game.

What ball are you using when testing? If you are using a range ball, be aware they don't perform like the urethane ball (such as the Titleist Pro V1) and will produce different numbers. More importantly, they don't give you the consistency from ball to ball. We have done extensive testing on range balls to come to this conclusion. So unless you're at one of the high end private clubs that has ProV1 practice balls, we don't recommend testing with range balls.

There are a few different kinds of launch monitors, all of which have their strengths and weaknesses. Radar is able to measure

how the ball flies to its apex. They do a great job of giving you accurate distances. (Note: when we have visited the major OEM's (Original Equipment Manufacturer), they only test with radar if the wind is less than 4 mph. So be aware of the conditions when you test.) Radar does not measure where the ball impacts on the face with resultant path and angle of attack. Infrared monitors measure the initial launch conditions (spin, launch angle and ball speed), and measure all club data including where the ball is struck on the face. They calculate distance. With many launch monitors, that data can be made to look better or worse than it is. Be careful if the distances you are getting are much longer than what you get on a course. In most cases the distance you get may be lower than you expect since the average golfer over-estimates the distance they hit the ball, especially in the air.

Club head speed is a number players are familiar with, but it one of the LEAST important numbers. Speed is certainly a factor, but it's HOW you use it that is the key. Let's take two drag race cars: Car #1 has 5000 horse power, but the wheels are spinning. Car #2 has only 2500 horse power but it optimized to maximum performance out of that 2500 horse power. Car #2 is faster.



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Again, speed is important but getting the most out of what you have is the key to maximum distance.

In terms of backspin (measured in RPMs), every shot hit with the exception of the putter has backspin. In general, the more loft the club has, the more backspin created – but there are many factors. For example, let's say you have two wedges. Both are the same loft, yet one produces much more spin than the other. This can be due to different centers of gravity.

Additionally, have you ever had your putter numbers checked? They can be just as important to improving your game. Patterns are much more repeatable with your putter, so understanding what your tendencies are can help you improve your putting.

Concerning axis tilt or side spin, there is actually no such thing as side spin since the ball only spins in one direction. It tilts on its axis, and the greater the tilt, the more the ball may curve. Many launch monitors use the term 'side spin' to make it easier to understand. That's fine, if you understand the ball can only spin in one direction.

The angle of attack varies from several degrees UP on impact with a driver to several degrees DOWN with most iron shots. The angle may also be more purposely downward with wedges or shots from the rough. Changing this angle can affect the launch angle, the spin rate, and ultimately the speed and efficiency of the shot.

The angle of path is similar to the angle of attack. A more correct path of the club to the target can reduce side spin, improve accuracy and distance of the shot, but more importantly where the ball ultimately lands.

Face to path is equally important and related to angle of path and angle of attack. When contact is made with the ball, the face angle, the angle of attack and the angle of the club path may all work together to produce a quality result or, if working against each other, could result

in a low, offline flight with poor distance. Not all swings are similar or perfect, but the straighter the path and the more square the face to the target, the better the flight will generally be. Add a proper angle of attack with decent club speed and that ball will fly.

Contact point on face: Here is the X factor. Spin, launch and ball speed can be drastically affected. Example: A driver hit high on the toe can produce high launch, low spin (the best combination for distance). However, this may not be produced by your best swing. So knowing where each shot has been struck on the face before analyzing the number is a must. We all mishit shots. One major manufacturer did a test with player of

only works on paper. Even for the best players in the world, that spin rate is too low so the slightest mishit will produce very inaccurate shots. Each golfer has their own optimum launch conditions. For example, Player A has the following numbers: 140 mph ball speed, 11 degree launch angle and 2800 rpm back spin. If we just look at those numbers one might say increase the launch and lower the spin to something like 15 degrees launch angle and 2200 rpm spin. However, this is impossible for Player A to achieve because of a 3 degree down angle of attack. Player B has the same numbers but hits UP 3 degrees. In Player B's case, we can change the launch and spin gaining them 10-15 yards. This is a very simplified example as all swing data must be taken



handicaps 10 and higher hitting drivers, and found them using the entire face!

As the loft of the club increases, all of your numbers will change. Example: A driver swing is best when the path is in-to-out and the angle of attack is up; a wedge is best hit with an out-to-in path and a down angle of attack.

What are the optimal launch conditions? Well, they are different for each player. There is a mathematical formula for a driver of 17 degrees launch angle with 1700 RPM back spin. This formula

into account – but it's a good, quick look at what can happen.

Our job as club fitters is to find the best equipment for the swing of the player. We are not trying to change the player's swing. All swings are different, creating different numbers and requiring different equipment. When we get a client's basic numbers and find they are outside reasonable parameters, we then recommend them to get professional instruction rather than fit to a bad swing. 