2019

Shaft Fitting Addendum

Chapter 5
DSFI Listings

THE DSFI FITTING PROCEDURE

This DSFI Fitting Procedure continues to be a work in progress by updating and simplifying on a yearly basis. However, it is important to follow all of the steps in order to better fit your customer. A few factors have been changes compared to that outlined in Chapter 7 of "The Modern Guide to Shaft Fitting". The new information will supersede that information that has been published in the past. The reason for the change has to do with updating the information based on field testing as well as information gathered by custom clubmakers who have used publication on a regular basis for their shaft fitting.

Before delving further into the text, there are a few very important issues to address. First is the concept of the Dynamic Shaft Fitting Index (DSFI). The key word is "*Index"* as it is a means of comparing one shaft to another. The index number was then adjusted to reflect something that clubmakers could reference, which is swing speed as a guide to shaft fitting. Over the years, this has served its purpose well as the concept of shaft matching to swing speed is quite common.

Probably the key to remember in this study is that the shafts are compared apples-to-apples under the same testing conditions and the parameters of the shafts were revealed. There are many valid theories on shaft fitting, some of which do not base shaft selection on clubhead speed. This text contains information to help those who fit by clubhead speed, and those that do not, because the information on each shaft is quantified so that one can see just how stiff a shaft is, how much torque, its' cut weight and the amount of tip stiffness. There will be times where you will find a person who uses a particular shaft well that doesn't necessarily *"fit by the book"*, whereas the shaft may be rated for someone who swings much faster or slower that what the individual does. It really does not matter, as the final outcome is what is most important anyway. But by knowing what the specifications of that shaft are becomes equally important, because any other shaft with similar qualities would also be a suitable shaft choice for that individual.

Take some time to examine the charts at the end of this chapter. Look very closely to find shafts you might have used in previous clubs. Take note of the ones you hit well and ones you have not. Examine the specifications and you might just notice certain parameters that are alike. This is important, because shafts that share common characteristics will normally play and feel the same. That is if the weight, then the frequency, butt and tip deflections and finally torque are alike then they should perform similarly. This can save customers money by avoiding shafts that share similar characteristics to ones you have not fared well within the past. In addition, it will allow you to look toward newer shaft models that share similar parameters to those you have used well in the past.

Step #1 - Personal interview
Ask questions concerning the golfer's existing clubs. Chances are if someone is in your shop, then something must be wrong with a particular club(s) as they don't match the requirements for their swing correctly. Are the existing clubs too heavy, too light or just right? Are the existing clubs too stiff, too flexible or just right? Does the ball go left, right or straight to the target? How far does the person hit a Driver and/or a #5-iron? Lastly, what are the goals of the golfer?

Some of these questions may have some influence on the shaft selection, especially the weight and the flexibility. Other questions are only for your reference. The ball going right may be influence more by offset, center of gravity or the face angle of the woods or the lie angle of the irons. The height of the shot will be more influenced by loft, angle of attack, solidness of impact than by shaft selection. Remember, the more accurate the information that is provided, the better result of any fitting will be in the long run.

Step #2 - Measure existing clubs
Often overlooked, it is important to measure the golfer's existing clubs to help identify the possible shaft selections. If all you have is a swingweight scale, you can measure the overall weight of the club. If the golfer complained the club was too heavy, then all you need to do is find a lighter shaft that what was already in the club(s). For other specifications you may need more sophisticated tools to measure with, such as a frequency analyzer. This way you can compare a certain shaft to those tested in this addendum.

If the shaft in the golfer's current clubs is in listed this addendum, you can look up the specifications and analyze why the person is not satisfied with it. Use the previous portions of this addendum as a reference. In cases where the shaft is not listed in this addendum (as in the case with proprietary shafts) get as much information as possible either through measuring the clubs or obtaining as much information from the manufacturer. Note, the specifications (other than weight) the manufacturer supplies may differ slightly from how we would measure the same shaft.

Step #3 - Determine the golfer's swing speed
It is not only important to measure the swing speed, but also how that speed is obtained through the tempo of the swing. For example, if two golfers both have a 100-mph swing speed with their driver, but one has a fast tempo and the other has a slow

tempo, then the two golfers do not necessarily use the same shaft. We shall make adjustments while we measure the golfer's swing speed.

For accurate clubhead speed recording it is necessary to have the golfer warm up first. After the player hits a few shots, use an accurate swing speed device to obtain the clubhead speed for the Driver and/or #5-iron. Then have him or her hit a standard length Driver or a #5-iron. Take the average of 5 swings with each club as you will find there will be a slight variance from one swing to the next.

The swing speed measurements for DSFI were originally based on a GolfTek Golfswing Analyzer which is no longer available. Today there are a variety of devices on the market that can measure or estimate swing speed based on ball speed. Instead of the large standalone units of yesteryear, most units are now portable and some may be able to attach somewhere to the club. For the most part, any swing speed recording device measures driver swing speed similarly from one to another. However, I have seen greater fluctuation with iron speeds that it could put someone into a flex up or down if you relied solely on swing speed. Part of that can be explained on where the swing speed is measured at as all golfers will decelerate at impact. If the device measures the 6-8" before impact versus readings based on averages of the lower third of their swing, the latter will often be higher. This is why shaft manufacturers will suggest their iron fitting based on a driver's speed rather than a certain iron (like a #5, 6 or 7) that are used to fit players as there is no consensus there either.

Just a few years ago we have changed the DSFI formula to adjust the hybrid and iron shafts based on the player's driver swing speed. However, if you still want to test iron speed to see if it is proportional, there is no harm in that. I was able to find some data recorded with a Trackman launch monitor for PGA and LPGA players. Their 5-iron speed was @ 84% of their driver speed on average. Using the same percentages as the tour players, we could extrapolate the following chart. The 6-iron was added as many club fitters are using a 6-iron rather than a 5-iron in their fittings.

Driver (mph)	60	65	70	75	80	85	90	95	100	105	110
5-iron	50	55	59	63	67	71	76	80	84	88	92
6-iron	49	53	57	62	66	70	74	78	82	86	90

As a guideline for swing speed with a #5-iron (@ 26° loft), you can use the chart below based on #5-iron ***carry*** distance to equate to swing speed for this text. (Note: High elevation areas such as the Rocky Mountain region will yield greater distances than in the chart) Remember, basing on distance the customer says and actually does may not be accurate and end up putting the person in most cases too stiff of a shaft. Distance also has a lot to do with the player's angle attack and solidness of contact. However for fittings that are done over the phone or internet, there may be no other way of estimating the player's swing speed.

Estimated #5-iron swing speed vs. distance chart

Driver MPH	5-iron MPH	5-iron Carry Distance	Driver MPH	5-iron MPH	5-iron Carry Distance
54	45	93	90	76	155
56	47	96	92	77	158
58	49	100	94	79	162
60	50	103	96	81	165
62	52	107	98	82	169
64	54	110	100	84	172
66	55	114	102	86	176
68	57	117	104	87	179
70	59	121	106	89	183
72	60	124	108	91	186
74	62	127	110	92	189
76	64	131	112	94	193
78	66	134	114	96	196
80	67	138	116	97	200
82	69	141	118	99	203
84	71	145	120	101	207
86	72	148	122	102	210
88	74	152	124	104	214

In recent years launch monitors have been more commonly available to the general public. The launch monitors are designed to focus not only on launch angle and spin rate but ball speed as well. However, it should be noted the ball speed is not to be confused with club head speed values. Driver clubhead speed will be approximately 2/3rd of the ball speed as previously

noted. For those that have only had there ball speed measured, a chart is provided to approximate what your driver speed would be. It is important that you understand this is only a guideline because ball speed is affected by such things as the loft of the driver and how solidly the player hits the ball on the face of the club. It is not uncommon to see two players with the same swing speed but obtain entirely different ball speeds.

There is no substitute for having an accurate swing speed on your driver. But if all you have is ball speed, this chart should serve as a close enough approximation rather than guessing.

Driver ball speed (mph) vs. driver swing speed chart

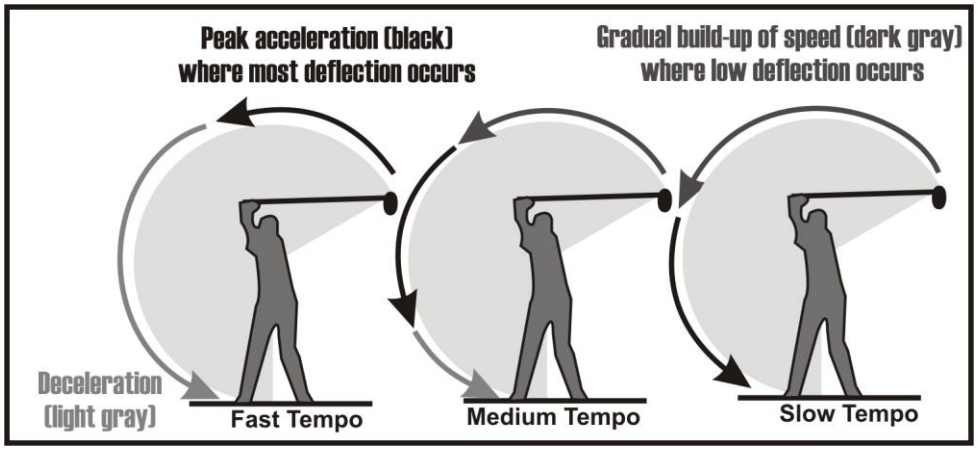
Ball Speed	Driver mph	Ball Speed	Driver mph	Ball Speed	Driver mph
89	60	127	86	165	112
91	62	130	88	168	114
94	64	133	90	171	116
97	66	136	92	174	118
100	68	139	94	177	120
103	70	142	96	180	122
106	72	145	98	183	124
109	74	148	100	186	126
112	76	150	102	189	128
115	78	153	104	192	130
118	80	156	106	195	132
121	82	159	108	198	134
124	84	162	110	201	136

Step #4 - Determine the tempo and length of the golfer's swing arc

Tempo (pace or rate of speed) is important from an accuracy standpoint when selecting shafts. If the golfer has a smooth tempo, the golfer's swing will look almost effortless. A smooth tempo will allow the golfer to opt for a lighter shaft as well as one that is more flexible. Many professional golfers generate high swing speeds because of the efficiency of their swing and not due to brute strength.

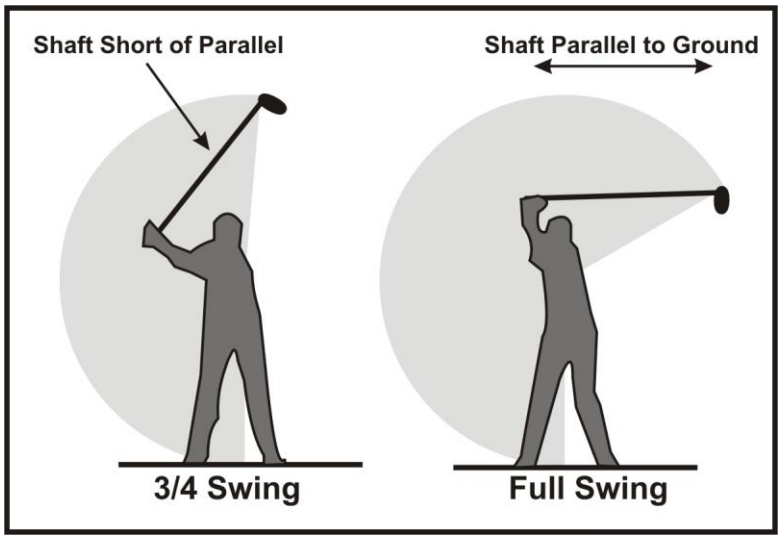
A golfer with a fast tempo tends to be less consistent from swing to swing. You can spot out a quick tempo by examining the initial part of the downswing. The reversal from the top of the take away to the initial downswing is harder to visualize as compared to the smooth tempo. The smooth tempo, there is a gradual buildup of speed throughout the downswing. The fast tempo has the greatest acceleration at the top of the swing; thus this swing type may need a heavier shaft and stiffer shaft as well.

If you cannot distinguish between the smooth and fast tempo swing, this is referred to as a moderate tempo. The moderate swing tempo will most likely need a moderate weight and stiffness shaft. The moderate tempo would consist of a good percentage of the golfers who walk into your shop.



Length of swing plays a factor as well. Typically, a golfer with a longer swing arc will use a more flexible shaft than someone with the same tempo and swing speed, but with a shorter swing arc. The reason for this is due to the rate of recovery. With a shorter swing arc (where the shaft is less than parallel to the ground) there is less time to allow for the shaft to load and then return to a square position. Thus the stiffer shaft with the shorter swing will yield more accuracy. As golfers become older, there can be less flexibility that can restrict the length of the swing arc. Even though the golfer's swing speed may decrease, it does not necessarily mean that the shaft flex needs to be decreased for these reasons.

A golfer with a short backswing and no wrist cock (an all arm swing), may need a much stiffer shaft than you would consider based upon their swing speed. Many newcomers to the game as well as many women golfers have this swing tendency. Not having a wrist cock greatly reduces clubhead speed. But as this golfer develops a wrist cock with lessons, their swing speed will automatically increase, thus it is best to recommend a stiffer shaft for them to grow into.



In the charts following labeled **"Driver, 5-iron or Hybrid Listed by DSFI"**, we have broken down the DSFI into several categories based on the tempo for quickly indexing the appropriate shafts. This should be a shortcut for those who do not want to do the math. Simply find the appropriate column based on your or your customer's tempo and length of swing, and go down until you find the person's swing speed.

Step 5 - Adjusted DSFI calculations (optional)
Remember that the DSFI is an indexing of the stiffness of shaft and not just a mile per hour rating of the shaft. However, to fit the golfer to their swing speed we need to factor both the golfer's tempo and length of swing and perform a small calculation to obtain and adjusted DSFI rating to look at appropriate shafts. It may be common that the DSFI range of the recommended shafts may be much lower or higher than the actual swing speed of the golfer. An explanation of a full swing is where the club goes to parallel (to the ground on the backswing) or beyond. Following are the factors for both tempo and length to consider.

Tempo
For a **fast tempo golfer will a full swing**, the DSFI rating of the shaft should be very close to the average swing speed of the golfer. For the adjusted DSFI, multiply the average swing speed by 0.97 and 1.02 to give the DSFI range for possible shaft selections. For example, if the golfer had a 90-mph average swing speed, then look for shafts with a DSFI rating between 87 and 92.

For a **moderate tempo with a full swing**, the person is not loading (or deflecting) the shaft as much as someone is with a quicker tempo. Thus, the person can opt to go to a slightly more flexible shaft. For the moderate tempo range, multiply the average driver swing speed by 0.92 and 0.97. For example, if the golfer has an average swing speed of 90-mph, then the DSFI range of shafts to look for would be between 83 and 87.

For the **slow tempo with a full swing**, the person doesn't load (or deflects) the shaft that much during the swing. This golfer could benefit from a softer shaft than normally would be thought of for a golfer with that swing speed. For example, if the golfer had an average driver clubhead speed of 90-mph, multiply that amount by 0.87 and 0.92. Thus look for shafts with a DSFI rating between 78 and 83.

If you do not feel comfortable with detecting the tempo of a golfer with a full swing, there is an alternative method. Use the moderate tempo with a full swing factors (92 – 97% of the golfer's swing speed). You can choose the higher frequency / higher torque combination for what looks like a faster tempo. For the golfer who may not look like a faster tempo then opt for the lower frequency / lower torque combination that yields the same DSFI rating.

Golfers who possess a **short back swing, with a wrist cock**, will need a stiffer shaft to compensate for the shorter distance traveled with the clubhead. For example, if the golfer had an average driver clubhead speed of 80-mph, multiply that amount by 1.02 and 1.07. Then look for shafts with a DSFI rating between 82 and 86.

Golfers who possess a **short back swing, without a wrist cock** will need even a stiffer shaft to compensate for the shorter distance the clubhead travels and allow them to grow into the shaft. For example, if the golfer had an average driver clubhead speed of 55-mph, multiply that amount by 1.15 and 1.25. Then look for shafts with a DSFI rating between 63 and 69.

Length
The club length has a direct bearing on the stiffness of a shaft. In Chapter 2 of the "2019 Shaft Fitting Addendum", in almost all cases the shafts were tested at lengths that could be normal lengths based on the weight of the shaft (and the balance point) with modern head weights to obtain a normal swingweight range. Each shaft in this study will specify what length it was tested at. In many cases, the length we tested the shaft and the length you will be making the club for you or your customer will be the same. In cases where you or the customer need longer or shorter lengths compared to the length the shaft was tested at, adjustments to the DSFI will need to be made.

It is important to realize that clubs made at different lengths than those we tested the shafts at will have an effect on the final DSFI rating. If a club is made shorter, yet the swingweight remains the same by adding additional head weight, then the club will be more flexible. The reason for this is twofold: the increased head weight will make the shaft more flexible, plus removing material from the butt end reduces the stiffest portion of the shaft. The converse holds true as well. If a club is made longer, but the head weight is reduced, then the shaft becomes stiffer. This is true if the shaft length is adjusted from the butt end only.

For example, many clubmakers have been making graphite-shafted irons longer than steel-shafted irons by approximately 1/2" to maintain a normal swingweight with the head weights that exist in the industry. Using a light weight steel shaft, 257 gram #5-iron and 50 gram grip, the swingweight is usually D-1 at 38". A non-tip heavy graphite shaft built to the same length will need approximately 7 additional grams of head weight. But by making the club 1/2" longer, the swingweight is the same without the additional 7 grams of head weight, thus increasing stiffness. The shaft length, if added to the butt end, being larger in cross-section further increases stiffness.

To make adjustments for non-standard DSFI lengths, you need to divide the adjusted DSFI (from the tempo) by the length constants below. For example, if the golfer needed a 1" over length driver and had a 100-mph average swing speed with a fast tempo, then the adjusted DSFI rating would range between 97 and 102. Now divide the adjusted DSFI by 1.036. The new DSFI range would be between 94 and 99, taking into account for the length of the club.

Conversion for Extending (+) or Reducing (-) Shafts from the Butt End Only

Woods	+2"	+1.5"	+1"	+0.5"	-0.5"	-1.0"
	1.075	1.056	1.036	1.018	0.983	0.966
Hybrids			+1"	+0.5"	-0.5"	-1.0"
			1.034	1.017	0.983	0.967
Irons			+1"	+0.5"	-0.5"	-1.0"
			1.033	1.016	0.984	0.969

(Note: not all shafts can be used at that length and obtain the desired swingweight with the weights of the components you have. Consult the How to Use This Addendum to Compute Swingweight, Head Weight and Approximate Frequency section in this chapter.)

Swingweight (optional)
The men's flex shafts were tested at D-1 and the ladies flex shafts were tested at C-6 for the calculated DSFI ratings. In the world of custom club fitting, all golfers will not play with one swingweight. Therefore conversions must be made to adjust for non-standard DSFI testing procedures. If the swingweight of a men's flex shaft is less than D-1 (***assuming grip weight is not decreasing the swingweight***), the shaft becomes stiffer. For example, if the frequency of a club is 250 cpm at D-1, then at C-9 the frequency will be 252 cpm. If the swingweight is higher such as D-3, then the frequency will decrease to 248 cpm. Add 1 mph to the player's adjusted swing speed for each 3-swingweight point increase for clubs to be built higher than a D-1 swingweight (C-6 for ladies), For clubs built lighter than D-1 (C-6 for ladies), subtract 1 mph to the player's adjusted swing speed for each 3-swingweight point decrease. Note this is only for standard grip weights such as 50g for men and 42g for women.

For example, a golfer has a 100-mph swing speed, but he has a slow tempo with a full swing. The adjusted DSFI for his tempo will be between 87 and 92. If he needs a swingweight of D-4 using a standard weight grip (approximately 50g), then the adjusted DSFI based on the swingweight will now be between 88 and 93. Starting out with a slightly stiffer shaft will then be offset by the higher-than-normal swingweight during the assembly. Note, that it would require a rather substantial change in swingweight to cause the shaft's flex to change.

Grip Weights (optional)
The grip weights used to calculate the DSFI for each shaft are listed in the Cut Shaft Data tables. Not all grips that clubmakers use will weigh the same as what we used to test the clubs. It is important to know that changes in grip weights or grip sizes do not affect the stiffness of the shaft, only the balance point of the club. The only parameters that affect stiffness of a shaft are the length of the shaft and the weight of the clubhead.

If you are using a lighter grip than what was listed in the Cut Shaft Data to increase the swingweight over the standard DSFI measurement (D-1/C-6), then there is no change in the DSFI swing speed ratings. Remember, the head weight hasn't increased to make the shaft any more flexible. However, if you are using a lighter weight grip than what was used to test the shaft to obtain the standard DSFI swingweight, then this will be the same as using a lighter swingweight. For example, if you were using a 25g grip instead of a 51 g grip, less head weight would be necessary to obtain the desired swingweight. Thus the shaft would react as if the swingweight was C-6, instead of the D-1 the club actually will become.

If you are using a heavier grip than what was used in the Cut Shaft Data and you will increase the head weight to bring the club back to the D-1 swingweight, and then you will need to make the DSFI adjustments. For example, if you were to use a 66 g oversized grip instead of a 51 g grip that was used in the testing, the club will be counterbalanced by 3-swingweight point to C-8 (5 grams equals 1 swingweight). To bring it back to D-1, then additional head weight is required and follow the steps above regarding swingweight conversions. Note, that it would require a rather substantial change in grip weight and subsequent alteration to swingweight to cause the shaft's flex to change.

Counterbalancing works the same way. It will affect the swingweight, but has no influence on the stiffness of the shaft. If you were to counterbalance, treat the flex as if it was not counterbalanced.

Step #6 - Start looking at the applicable selection of shafts
Study the shafts for a given swing speed range in the back of "The 2019 Shaft Fitting Addendum". These shafts are labeled either "Driver Shaft Listing by DSFI Ratings", "#5 Iron Shaft Listing by DSFI Ratings" (now divided separately into steel and graphite) or "Hybrid Shaft Listing by DSFI Ratings".

Step #7 - Take note of cost consideration
Naturally, cost is an overriding factor in fitting a player with a shaft. Determining the best shaft for a player is meaningless if he or she cannot afford the club. Because fitting with DSFI involves considering a wide range of shafts and matching those to a player's swing, there will be times when the shaft of choice ends up being a potentially expensive investment. After all, individual shafts can range from $4 for commercial grade steel shafts to as high as $1000 for uber-premium graphite. Be certain to select the best shaft choice that is within the customer's budget.

Step #8 - Take note of compatibility with different head types
Not all shafts listed herein can be assembled with any clubhead. Do some homework as to what types of heads are compatible to the shafts. For instance, is the hosel parallel or taper? What is the size of the inside diameter of the hosel? Does the shaft have ample parallel tip length for the hosel length after tip trimming? Is the shaft weight proper for the head weights and lengths that you will assemble the clubs? Is the shaft designed for through bore or standard metal wood? For answers to these questions consult the Hireko catalog or the manufacturer to see if the shafts are compatible with the heads that you have chosen for your customers.

Step #9 - Sort shafts by weight and material
Sort shafts by their material(s) - as denoted in the following DSFI listing - and weight(s) whether by request from the golfer or through your own fitting recommendations. For example, is a graphite shaft a viable choice for the golfer? If so, what weight range is most appropriate?

Remember the fundamental rules of fitting. Whenever a golfer has a quick tempo, opt for a heavier weight shaft in whatever material you are seeking. For slow tempo golfers, they are candidates for using lighter weight shafts. The length of the swing arc can also play importance in the proper shaft weight. The longer the golfer's swing arc, potentially they could use a lighter weight shaft, while a shorter golf swing may need a heavier weight shaft for added control.

Step #10 - Sort shafts by bend point description or T/B Ratio
Although bend point / or kick point are not distinguished by a large measurable range, as stated in Chapter 6 of "The Modern Guide to Shaft Fitting", they do impact a definite "feel" difference. For instance, the True Temper Dynamic Gold steel pattern has a stiffer feel in the tip than does the Multi-Step Lite pattern, but yet has the similar DSFI ratings in like flexes.

The T/B Ratio can be helpful to identify shafts that may hit the ball higher than another with the same head. The higher the T/B Ratio, typically the more flexible the tip and subsequently a higher launch angle may occur. Another thing we have

found is a shaft with a higher T/B ratio can produce a draw bias, or assist in allowing the clubface to close. For woods, a T/B Ratio of 3.0 or higher could be considered draw bias, while shafts with a 2.2 or lower T/B Ratio could be considered sliced bias, or assist those who hook the ball. For irons, a T/B Ratio of 1.7 or higher could be considered draw bias, while shafts with a 1.4 or lower T/B Ratio could be considered sliced bias, or assist those who hook the ball. Special consideration may be needed for loft, angle of center of gravity or face angle on woods. Make sure as well to compare T/B ratios of shafts that were tested at the same length. Note: In the last few years, many of the newer entries do not include this entry as the digital deflection used to record the tip and butt deflections is not long providing accurate readings and was best to leave out of this addendum.

Step #11 (optional) - Sort shafts by frequency/torque relationship
If you have already adjusted for the tempo earlier, you need not follow this step. This is the alternative step mentioned earlier when adjusting DSFI by the tempo of the golfer. If the golfer has a slow swing tempo, find a shaft with a low frequency / low torque combination within the selected range of shafts. If the golfer has a fast swing tempo, then opt for a shaft with a higher frequency / higher torque relationship within the selected range of shafts. The stiffer shaft will stabilize the clubhead while the higher torque will typically offset the stiff feel.

Step #12 - Final considerations
Dampening: In cases where a golfer may have hand, wrist or joint discomfort while hitting golf balls could benefit from the new technology. Graphite or composite shafts has been known to dampen shock at impact. Steel shafts with special inserts inside the shaft can dampen shock upon impact.

Color: While not a performance issue, the color has some merit when fitting shafts. Does the golfer want a particular color, something flashy or plain? Cosmetically, will the club look like a finished golfer club? Even though the shaft may fit the golfer, would a pink colored head match up with a navy blue shaft and a lime green grip?

Brand Name Loyalty: Certain customers who come into your shop may ask for specific brand names. For companies that offer a full line of shafts, this should pose no problem finding a shaft that meets the swing speed and tempo requirements of the golfer.

Warranty: Some companies offer a lifetime warranty against breakage from normal use. Some companies may offer only limited warrantees. A small factor, but one you or your customer may deem important.

Working Examples

#1 (Simple Method)
A male golfer has a measured driver swing speed of 88 mph and possesses a fast tempo. He wants a graphite shaft in the 60 gram range and one that might reduce his fade. The first thing to do is find the chart labeled "Driver Shaft Listing by DSFI Ratings". Next, on the far right hand side find the column labeled "Fast Tempo". On the forth page of the Driver Shaft Listing by DSFI Ratings chart you will find a whole page of shafts with an adjusted DSFI between 87 and 89. Sometimes it may help to look for a DFSI number +/- 2 from the swing speed to have more selections to choose from. After all, the person's swing speed can vary slightly from one swing to the next as well as day to day. Now you can sort through the shafts that have a cut weight in the 60g range, plus look at all shafts with a higher T/B Ratio (of 3.0 or higher) to help reduce the fade. Lastly, you can sort by manufacturer, cost, color, etc.

#2 (Advanced)
We have a golfer who is looking for graphite shafts in his irons. He normally carries his #5-iron 170 yards. We have determined that he has a full swing with a slow tempo and from dynamic fitting a 38.5" #5-iron is best suited to him. Lastly, he felt the clubhead best with a D-3 swingweight using a normal weight grip. Here are the adjustments to find the appropriate range of shafts that would work for him.

Examining the swing speed vs. distance chart, 170 yards would approximate an 82 mph swing speed with his #5-iron (98 mph swing with the driver). Next we adjust for his tempo. With a slow tempo, we multiply his driver swing speed by 0.87 and 0.92. The adjusted DSFI range is between 85 and 90.

Next we adjust for the non-standard DSFI swingweight of D-1. Because we are using a standard weight grip, we will add 1 mph to the adjusted DSFI range (1 mph equals two swingweights). The adjusted DSFI range is now between 86 and 91. Now look at the shaft choices in the DSFI column between 86 and 91 and find appropriate graphite shafts in the "#5-iron Listings by DSFI Ratings" section.

#3 (Advanced)
In another example, we have a lady golfer who has a short back swing with no wrist cock. We have determined from a dynamic fitting a 36.5" #5-iron is best suited to her. Lastly, she liked the feel of a graphite shafted demo club with a C-2 swingweight using a normal weight ladies grip. Here are the adjustments to find out the range of shafts that will work best for her.

We measured her swing speed with a #5-iron and find it to be 52 mph. Using our conversion chart, that would translate into a 62 mph driver swing speed. Next we adjust for the tempo. With a short back swing and no wrist cock, we multiply her driver swing speed by 1.15 and 1.25. The adjusted range would be between 71 and 78.

Next we adjust for the lighter C-2 swingweight. Since the swingweight is lower than C-6, we need a more flexible shaft. For each 2 swingweights, we will subtract 1 mph off the adjusted DSFI range. The new range is now between 69 and 76. Now look at the shaft choices in the DSFI column between 69 and 76 and find appropriate graphite shafts in the "#5-iron Listings by DSFI Ratings section.

Special Consideration

In some cases, a shaft selection may not be close to the golfer's adjusted swing speed range, due to cost, material, weight, etc. In these situations, pick a shaft that is the closest fit to the parameters required by the golfer. It may not be an exact match; however it will be a safer selection than other shafts with DSFI ratings further from the actual swing speed of the golfer.

Special Note

Don't overlook the importance of the cut specifications, especially when working with a customer that happens to use a particular shaft well where the DSFI rating is nowhere close to his or her swing speed and the adjusted tempo. If that shaft happens to have been tested in this publication, pay very close attention to the cut weight, frequency, length, torque, and butt and tip deflections. If you find another shaft(s) with similar numbers, the shaft should react equally as well regardless of manufacturer. While this might be contrary to the DSFI Fitting Procedure, we are most concerned with obtaining a correct fit. After all, these specifications make up the DNA of the golf shaft.

How to Use This Addendum to Compute Swingweight, Head Weight and Approximate Frequency

Example: We will use the True Ace Cadence Orange Fairway shaft in an R-flex. The shaft was tested at a length of 43" and standard swingweight of D-1, but we want to make the club 44" with a swingweight of D-0. How much head weight do we need and what will be the approximate frequency? Here are the measurements from the actual cut data:

Head wt.	Grip wt.	CPM	Swingweight	Length
213.2 g	51g	258	D-1	43"

First, let us change the length to 1" longer. Remember that for each ½" addition in length will result into a 3 swingweight-point increase.

Head wt.	Grip wt.	CPM	Swingweight	Length
213.2 g	51 g	?	**D-7**	**44"**

What would be the approximate frequency of the club become with the changes? Since the swingweight is 6 points higher, the frequency will go down 1 cpm per swingweight, so the final result will be:

Head wt.	Grip wt.	CPM	Swingweight	Length
213.2 g	51 g	**252**	D-7	44"

If we wanted the swingweight to be D-0, how much head weight will be necessary? Examine the chart on the next page to see how much weight is required per swingweight and length. At 44", each swingweight requires 1.65 grams. To reduce the swingweight from D-7 to D-2, then we would need to reduce the gram weight by 8.3 g.

Head wt.	Grip wt.	CPM	Swingweight	Length
204.9 g	51 g	?	**D-2**	44"

What would the adjusted frequency be in this case? Since the swingweight is 5 points lower, the frequency will increase by 5 cpm.

Head wt.	Grip wt.	CPM	Swingweight	Length
204.9 g	51 g	**257**	D-2	44"

What happens when we will use a grip weight different from that tested in the addendum? If we take our previous scenario, but change the grip weight to 65 grams, what would be the new swingweight? Remember, for each 5 grams of grip weight compared to what was listed, the swingweight will change by 1 point. Therefore 15 grams of additional grip weight will decrease the swingweight by 3 points.

Head wt.	Grip wt.	CPM	Swingweight	Length
204.9 g	**66 g**	257	**C-9**	44"

Notice that the frequency of the club did not change. There are only two factors that affect frequency; head weight and length. By changing grip weight, there is no change to the frequency of the club. However, your frequency analyzer may pick up a small change due to the density or pressure exerted on the clamping mechanism.

If we use the same scenario, but want to have a swingweight of D-2, how much head weight will be necessary? Remember, 1.65 grams per swingweight is needed at 44". So a change in 3 swingweight is 5 g.

Head wt.	Grip wt.	CPM	Swingweight	Length
209.9 g	66 g	?	**D-2**	44"

What will be the final frequency of the club become now? Since we are adding 3 swingweights to the club, the frequency will be reduced by 3 cpm.

Head wt.	Grip wt.	CPM	Swingweight	Length
209.9 g	66 g	254	**D-2**	44"

These examples are made to show you how to use the addendum to figure out ahead of time what the parameters might be if you were to build the club differently than what was tested. Your results may vary slightly due to the tolerances of the

components such as raw shaft frequency, shaft weight and balance point. The lie angle of the head as well as its center of gravity could also have an influence on the final outcome.

CLUB LENGTH & SWINGWEIGHT

Driver Length	Grams/ Swingweight	5-iron Length	Grams/ Swingweight
45”	1.60	39.5”	1.95
44.5”	1.63	39”	1.98
44”	1.65	38.5”	2.03
43.5”	1.68	38”	2.07
43”	1.71	37.5”	2.11
42.5”	1.74	37”	2.16
42”	1.77	36.5”	2.21
41.5”	1.80	36”	2.26
41”	1.84	35.5”	2.31

Adjusting for frequency and head weight for the modern driver

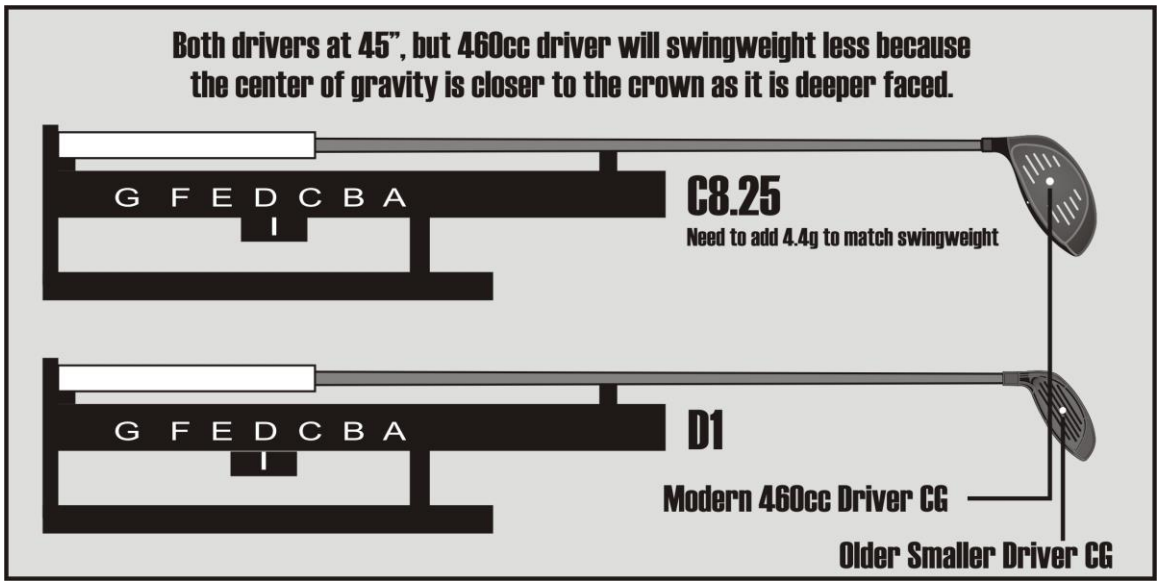
In the 30 years that the Dynamic Shaft Fitting Addendum has been published, a lot has changed in the world of clubheads, especially drivers! 28 years ago, metal woods were finally outselling woods made of “wood”. These metal woods were in the 150cc range or the size of a modern 3 wood. The bottom of bore to ground line was much higher off the ground (our M1 bore designation) compared to blind bore wood heads. We had to decide what our bore type would be based on for our testing so we could compare apples to apples in a real world setting. Since 1996, we have been using the same blind bore head for testing.

As the years went by, heads became larger and the bore types of the most popular heads changed as well. When you leaf through the pages of this addendum you will find the bore type of most of the woods are based on a blind bore or where the shaft seats ½” above the ground line. The modern driver has a bottom of bore to ground line closer to 1.5 to 2”. The dilemma we had was changing heads and not being able to compare shafts tested previously the same way. So if you find yourself using this addendum and your frequencies of the clubs you are building or retro-fitting are slightly lower, that is the reason why. However, they should be all consistently lower as we have tested the shafts the same way.

The modern driver will exhibit a frequency @ 5 cpm lower at the same length and swingweight. This is due to the shaft tip being 1” higher off the ground than a blind bore head. The only exception would be a shaft that adjusts for the bore type in the tip trimming instructions. At this time, the only shaft listed in this addendum that is still current would be the True Temper Dynamic Gold steel shaft.

Another slight byproduct of the modern 460cc driver is the center of gravity location over the smaller metal wood driver we had used in our testing. Since the center of gravity of the head is closer to the fulcrum point on the swingweight scale, it will require more weight to achieve the same swingweight as the stated length. In our case it will be @ 4.4g.

Another way to think about it is you can make a modern 460cc driver and extra ½” longer than listed in this addendum with the same shaft and head weight and nearly achieve the exact same swingweight.



DRIVER SHAFTS LISTED BY DSFI RATING

Manufacturer	Shaft	Flex	Shaft Weight (g)	Freq. (cpm)	Butt Deflect. (oz.)	Tip Deflect. (.oz.)	T/B Ratio	Torque Cut (deg)	Length (in.)	DSFI	3/4 Swing	Fast Tempo	Medium Tempo	Slow Tempo
Graman	M70 LL/L	LL	65.5	206	21	6	3.5	5.56	44"	68	67	70	74	78
UST Mamiya	dRVR	L	55.4	216	-	-	-	6.52	44"	69	68	71	75	80
Graman	Crossfire	L	73.2	225	27	7	3.9	7.99	44"	69	68	71	75	80
Graphite Design	Tour AD SL II 4	RR2	47.5	200	11	5	2.2	5.30	45"	69	68	71	76	80
Aldila	NVS Pink 45	L	43.5	219	24	9	2.7	6.33	44"	71	69	73	77	81
Grafalloy	ProLaunch Blue 45	L	43.8	213	23	8	2.9	5.38	44"	71	70	73	77	82
Aldila	VL	L	66.8	237	36	15	2.4	6.25	42"	71	70	74	78	82
iBella	Obsession	L	56.5	229	31	9	3.4	6.21	43"	72	70	74	78	82
Graman	M70 LL/L	L	65.4	214	23	7	3.3	5.26	44"	72	70	74	78	82
Graman	Crossfire	A	76.5	226	26	6	4.3	7.65	45"	73	71	75	79	84
Apollo	Shadow FL	L	51.3	235	32	12	2.7	7.67	44"	73	71	75	79	84
Acer	Velocity 45	L	49.3	225	29	13	2.2	8.08	45.5"	73	71	75	79	84
Graphite Design	Tour AD SL II 4	RR1	48.1	212	15	6	2.5	5.33	45"	73	72	76	80	84
Aldila	NV Green 55	L	49.9	219	25	10	2.5	5.19	44"	73	72	76	80	84
Graphite Design	G-Tech A&L	L	58.7	231	28	9	3.1	6.75	44"	74	72	76	80	85
UST Mamiya	Competition Series	L	52.3	233	34	10	3.4	5.79	43"	74	72	76	80	85
Graman	R70	L	63.5	225	29	6	4.8	5.70	44"	74	73	76	81	85
Graman	M70 A/L	L	67.8	221	24	7	3.4	5.08	44"	74	73	77	81	86
UST Mamiya	dRVR	A	62.5	223	-	-	-	6.38	45"	74	73	77	81	86
Grafalloy	ProLaunch Blue 45	A	42.4	221	26	9	2.9	5.87	45"	75	74	77	82	86
Apollo	Shadow Graphite	L	64.4	242	37	15	2.5	6.17	43"	76	74	78	82	87
Acer	Velocity	L	61.7	234	25	4	6.3	6.00	44"	76	75	79	83	88
Acer	Velocity	A	65.1	231	26	7	3.7	6.69	45"	76	75	79	83	88
Graman	M65	L	57.4	234	29	6	4.8	5.79	44"	77	75	79	84	88
Apollo	Shadow UL Graphite	L	58.6	234	30	9	3.3	5.77	44"	77	75	79	84	88
Apollo	Shadow FL	A	52.9	237	33	11	3.0	7.36	45"	77	75	79	84	88
UST Mamiya	dRVR	R	63.2	237	-	-	-	7.28	45"	77	76	79	84	89
Graman	M70 A/L	A	70.7	221	25	5	5.0	5.08	45"	77	76	80	84	89
Graman	R70	A	66.4	224	27	5	5.4	5.43	45"	77	76	80	84	89
Aldila	VX	R	75.5	250	43	14	3.1	6.26	43"	78	76	80	85	90
Graphite Design	Tour AD SL II 5	R2	55.5	221	14	7	2.0	4.82	45"	78	77	80	85	90
SK Fiber	Tour Trac 55	A	55.0	227	-	-	-	5.55	45"	78	77	81	86	90
UST	ProForce V2 HL 55	F2	51.2	221	-	-	-	4.70	45"	78	77	81	86	90
Grafalloy	ProCustom	L	61.5	238	32	11	2.9	5.53	44"	79	77	81	86	91
Aldila	VL	A	69.1	246	35	13	2.7	5.21	43"	80	78	82	87	92
UST Mamiya	ProForce V2 65	A	58.3	225	-	-	-	4.77	45"	80	78	82	87	92
Graphite Design	G-Tech A&L	A	63.2	239	31	11	2.8	6.34	45"	80	78	82	87	92
UST Mamiya	Competition Series	A	57.0	233	30	7	4.3	5.54	45"	80	78	82	87	92
Graman	M70 A/R	A	70.2	229	30	6	5.0	5.06	45"	80	79	83	87	92
Apollo	Shadow Graphite	A	66.3	246	40	12	3.3	5.97	44"	80	79	83	87	92
Graphite Design	Tour AD MJ 5	R2	51.3	226	-	-	-	4.70	45"	80	79	83	87	92
SK Fiber	Tour Trac 65	A	62.6	226	-	-	-	4.77	45"	80	79	83	88	92
Graman	Crossfire	R	84.3	245	34	10	3.4	6.88	45"	81	79	83	88	93
Aerotech	Claymore MX48	S	46.4	232	24	18	1.3	5.23	45"	81	79	83	88	93
Graphite Design	Tour AD MT 5	R2	53.2	227	22	9	2.4	4.68	45"	81	79	83	88	93

DRIVER SHAFTS LISTED BY DSFI RATING

Manufacturer	Shaft	Flex	Shaft Weight (g)	Freq. (cpm)	Butt Deflect. (oz.)	Tip Deflect. (.oz.)	T/B Ratio	Torque Cut (deg)	Length (in.)	DSFI	3/4 Swing	Fast Tempo	Medium Tempo	Slow Tempo
Apollo	Shadow Graphite	R	69.2	248	40	11	3.6	6.02	44"	81	79	83	88	93
Apollo	Shadow UL Graphite	A	59.9	236	33	11	3.0	5.59	45"	81	79	83	88	93
Acer	Velocity	R	64.4	241	26	6	4.3	6.16	45"	81	79	83	88	93
Graphite Design	Tour AD DI 5	R2	51.6	230	23	10	2.3	4.83	45"	81	80	84	89	93
Apollo	Shadow FL	R	54.8	250	39	11	3.5	7.23	45"	81	80	84	89	94
Graman	M65	A	60.5	237	30	6	5.0	5.45	45"	82	80	84	89	94
Graphite Design	YS-Reloaded Five	R	54.3	229	-	-	-	4.57	45"	82	80	84	89	94
UST Mamiya	ProForce V2 55	A	53.4	225	-	-	-	4.15	45"	82	80	84	89	94
Grafalloy	ProLaunch Blue 45	R	43.4	240	31	12	2.6	5.62	45"	82	81	85	90	95
UST Mamiya	Competition Series	R	59.3	242	33	9	3.7	5.75	45"	83	81	85	90	95
Acer	Velocity 45	A	51.3	231	27	13	2.1	6.92	47"	83	81	85	90	95
UST Mamiya	65 Gold	R	59.7	241	32	9	3.6	5.58	45"	83	81	85	90	95
Graphite Design	Tour AD BB 5	R2	53.4	230	18	9	2.0	4.29	45"	83	81	86	91	96
Apollo	Shadow UL Graphite	R	60.7	246	36	7	5.1	5.98	45"	83	82	86	91	96
SK Fiber	Tour Trac 55	R	57.3	243	-	-	-	5.53	45"	83	82	86	91	96
UST Mamiya	MP5	R	49.9	231	29	8	3.6	4.36	45"	83	82	86	91	96
Acer	Velocity	S	65.1	247	28	7	4.0	6.09	45"	83	82	86	91	96
Aldila	NV 55	R	52.9	240	30	15	2.0	5.20	45"	83	82	86	91	96
Grafalloy	ProCustom	R	66.7	246	37	8	4.6	5.88	45"	84	82	86	91	96
Apollo	Shadow Graphite	S	70.3	256	44	15	2.9	5.95	44"	84	82	86	91	96
Graman	M70 A/R	R	70.5	236	32	7	4.6	4.76	45"	84	82	86	91	96
Graman	Crossfire	S	85.7	251	36	12	3.0	6.47	45"	84	82	86	91	96
Graphite Design	Tour AD SL II 5	R1	56.8	236	19	9	2.1	4.72	45"	84	82	86	91	96
UST Mamiya	dRVR	S	67.8	254	-	-	-	6.72	45"	84	82	86	92	97
Graman	M65	R	64.6	242	32	7	4.6	5.23	45"	84	82	87	92	97
Graphite Design	Tour AD DI 5	R1	51.3	237	25	12	2.1	4.71	45"	84	82	87	92	97
Graman	M70 R/S	R	70.4	242	33	7	4.7	5.22	45"	84	82	87	92	97
Grafalloy	ProLaunch Blue 45	S	44.3	247	33	13	2.5	5.71	45"	84	83	87	92	97
Apollo	Shadow FL	S	53.9	258	40	10	4.0	7.06	45"	84	83	87	92	97
UST	ProForce V2 HL 55	F3	54.7	234	-	-	-	4.33	45"	84	83	87	92	97
Aldila	VX	S	76.5	265	51	15	3.4	5.49	43"	85	83	87	92	98
Grafalloy	ProCustom	A	61.9	241	32	12	2.7	4.94	45"	85	83	87	92	97
Graphite Design	Tour AD GP 5	R2	53.2	235	-	-	-	4.34	45"	85	83	87	92	98
House of Forged	Express	R	57.3	246	-	-	-	5.44	45"	85	83	87	92	98
Graphite Design	G-Tech R&S	R	65.3	250	33	11	3.3	5.89	45"	85	83	87	92	98
Graphite Design	Tour AD MJ 5	R1	51.5	239	-	-	-	4.69	45"	85	83	87	93	98
Graphite Design	Tour AD MT 5	R1	52.7	239	25	11	2.3	4.68	45"	85	83	87	93	98
UST Mamiya	Competition Series	S	60.3	247	36	10	3.6	5.51	45"	85	83	87	93	98
Aerotech	Powercoil RH50	S	48.4	248	31	12	2.6	5.57	45"	85	83	88	93	98
UST Mamiya	ProForce V2 55	R	53.0	235	-	-	-	4.16	45"	85	84	88	93	98
Apollo	Shadow UL Graphite	S	60.4	252	40	9	4.4	5.69	45"	86	84	89	94	99
Aldila	NVS Orange 65	R	63.5	236	32	11	2.9	4.01	45"	86	85	89	94	99
Graphite Design	YS-Reloaded Five	S	56.2	241	-	-	-	4.48	45"	86	85	89	94	99
SK Fiber	Tour Trac 65	R	64.0	243	-	-	-	4.79	45"	86	85	89	94	99
Graman	M65	S	65.4	248	35	9	3.9	5.05	45"	87	85	89	95	100

DRIVER SHAFTS LISTED BY DSFI RATING

Manufacturer	Shaft	Flex	Shaft Weight (g)	Freq. (cpm)	Butt Deflect. (oz.)	Tip Deflect. (.oz.)	T/B Ratio	Torque Cut (deg)	Length (in.)	DSFI	3/4 Swing	Fast Tempo	Medium Tempo	Slow Tempo
Aerotech	Claymore MX60	S	58.7	242	28	10	2.8	4.36	45"	87	85	90	95	100
Acer	Velocity 45	R	52.8	246	34	13	2.6	7.22	47"	87	85	90	95	100
Apollo	Standard Stepped Steel	L	115.3	243	34	17	2.0	3.08	43"	87	86	90	95	100
UST Mamiya	MP5	S	50.6	242	-	-	-	4.32	45"	87	86	90	95	100
Graman	M70 R/S	S	71.0	248	33	8	4.1	4.85	45"	87	86	90	95	101
Graphite Design	Tour AD BB 5	R1	53.6	242	20	10	2.0	4.29	45"	87	86	90	95	101
Aldila	NV Green 65	R	63.1	239	32	14	2.3	3.94	45"	88	86	91	96	101
UST Mamiya	65 Gold	S	59.4	256	36	11	3.3	5.52	45"	88	86	91	96	101
Graphite Design	Tour AD SL II 5	SR	57.1	248	27	12	2.3	4.69	45"	88	86	91	96	101
Aldila	NVS Orange 75	R	71.0	236	31	13	2.4	3.58	45"	88	87	91	96	102
Aldila	NV Green 55	S	54.7	253	36	17	2.1	5.02	45"	89	87	91	97	102
Aldila	VS Proto by You 60	R	59.3	244	35	15	2.3	4.06	45"	89	87	92	97	103
Graphite Design	Tour AD DI 5	S	54.7	250	27	14	1.9	4.74	45"	89	87	91	97	102
Graphite Design	Tour AD GP 5	R1	54.3	245	-	-	-	4.24	45"	89	87	91	97	102
Graphite Design	Tour AD MJ 5	S	53.0	250	-	-	-	4.70	45"	89	87	91	97	102
Graphite Design	Tour AD MT 5	S	55.3	251	27	14	1.9	4.68	45"	89	87	92	97	103
House of Forged	Express	S	59.8	259	-	-	-	5.42	45"	89	87	91	97	102
House of Forged	Platinum	R	60.3	245	-	-	-	4.15	45"	89	87	91	97	102
SK Fiber	Tour Trac 55	S	57.3	260	-	-	-	5.50	45"	89	87	91	97	102
UST Mamiya	ProForce V2 65	R	61.5	238	34	11	3.2	3.50	45"	90	88	92	98	103
Grafalloy	ProLaunch Blue 65	R	63.6	250	-	-	-	3.50	45"	90	88	93	98	104
Graphite Design	G-Tech R&S	S	65.6	260	36	14	2.6	5.31	45"	90	88	93	98	104
Grafalloy	ProCustom	S	66.4	260	42	10	4.2	5.11	45"	91	89	93	99	104
Graphite Design	YS-Reloaded Six	R	63.4	242	-	-	-	3.52	45"	91	89	94	99	105
Aldila	NV Green 75	R	75.6	241	33	17	1.9	3.26	45"	92	90	95	100	106
Graphite Design	Tour AD BB 5	S	55.3	255	22	13	1.7	4.32	45"	92	90	95	100	106
UST Mamiya	ProForce V2 55	S	55.6	256	-	-	-	4.34	45"	92	90	95	101	106
Graphite Design	YS-Reloaded Seven	R	73.3	242	-	-	-	3.27	45"	92	91	95	101	106
Aldila	NVS Orange 65	S	64.5	251	36	16	2.3	3.91	45"	92	91	95	101	106
SK Fiber	Tour Trac 65	S	64.4	261	-	-	-	4.76	45"	92	91	95	101	106
Grafalloy	ProLaunch Red	R	61.1	249	32	18	1.8	3.73	45"	93	91	95	101	106
Graphite Design	Tour AD MJ 6	SR	58.7	244	-	-	-	3.31	45"	93	91	96	101	107
Aerotech	Powercoil RH65	S	62.0	250	32	16	2.0	3.70	45"	93	91	96	101	107
Aldila	NVS Orange 75	S	73.5	250	36	17	2.1	3.68	45"	93	91	96	102	107
Aldila	VS Proto by You 70	R	63.7	246	34	16	2.1	3.37	45"	93	91	96	102	107
Graphite Design	Tour AD GP 5	S	55.8	257	-	-	-	4.31	45"	93	91	96	102	107
Graphite Design	Tour AD MT 6	SR	59.5	246	26	11	2.4	3.33	45"	94	92	96	102	108
House of Forged	Platinum	S	60.4	257	-	-	-	4.01	45"	94	92	96	102	108
Graphite Design	Tour AD DI 6	SR	61.9	247	26	14	1.9	3.33	45"	94	92	97	102	108
Apollo	Standard Stepped Steel	A	123.2	250	36	16	2.3	2.93	44"	94	92	97	102	108
Graphite Design	Tour AD GP 6	SR	62.5	245	-	-	-	3.02	45"	95	93	98	103	109
Graphite Design	Tour AD BB 6	SR	61.7	247	22	11	2.0	3.10	45"	95	93	98	104	110
Apollo	Standard Stepped Steel	R	118.1	253	34	14	2.4	2.98	44"	95	93	98	103	109
Apollo	Standard Stepless Steel	R	122.6	254	36	15	2.4	2.95	44"	95	93	98	104	110
UST Mamiya	ProForce V2 65	S	61.5	253	39	14	2.8	3.47	45"	95	94	98	104	110

DRIVER SHAFTS LISTED BY DSFI RATING

Manufacturer	Shaft	Flex	Shaft Weight (g)	Freq. (cpm)	Butt Deflect. (oz.)	Tip Deflect. (.oz.)	T/B Ratio	Torque Cut (deg)	Length (in.)	DSFI	3/4 Swing	Fast Tempo	Medium Tempo	Slow Tempo
Aldila	NV Green 65	S	64.7	260	41	17	2.4	3.94	45"	96	94	98	104	110
Graphite Design	YS-Reloaded Six	S	65.2	254	-	-	-	3.49	45"	96	94	99	104	110
Grafalloy	ProLaunch Red	S	62.5	260	39	19	2.1	3.89	45"	96	94	99	104	110
Graphite Design	YS-Reloaded Seven	S	73.2	254	-	-	-	3.28	45"	97	95	100	106	111
Aldila	R.I.P. Alpha 60	S	59.3	259	36	16	2.3	3.59	45"	97	95	100	106	112
Grafalloy	ProLaunch Blue 65	S	64.9	259	-	-	-	3.63	45"	97	95	100	106	112
Graphite Design	Tour AD MJ 6	S	61.5	255	-	-	-	3.29	45"	97	95	100	106	112
Aldila	VS Proto by You 80	R	77.7	247	32	14	2.3	2.77	45"	97	96	100	106	112
Aldila	NV Green 75	S	73.8	258	40	18	2.2	3.44	45"	97	96	100	106	112
Graphite Design	Tour AD MT 6	S	62.2	256	29	15	1.9	3.28	45"	98	96	101	106	112
Graphite Design	Tour AD DI 6	S	61.7	258	29	15	1.9	3.36	45"	98	96	101	107	113
Apollo	Standard Stepped Steel	S	120.2	259	37	15	2.5	2.81	44"	98	96	101	107	113
Apollo	Standard Stepless Steel	S	125.5	260	38	17	2.2	2.85	44"	98	96	101	107	113
Aldila	VS Proto by You 70	S	68.2	257	37	18	2.1	3.23	45"	98	96	101	107	113
Graphite Design	Tour AD BB 6	S	62.1	258	23	13	1.8	3.13	45"	99	97	102	108	114
Graphite Design	YS-Reloaded Six	X	65.9	266	-	-	-	3.45	45"	100	98	103	109	116
Graphite Design	YS-Reloaded Seven	X	74.7	264	-	-	-	3.31	45"	101	99	104	110	116
Graphite Design	Tour AD GP 6	S	62.8	260	-	-	-	3.02	45"	101	99	104	110	116
Graphite Design	Tour AD M9003 6	S	66.5	262	-	-	-	3.17	45"	101	99	104	110	116
UST Mamiya	ProForce V2 65	X	60.8	265	-	-	-	3.32	45"	101	99	104	110	116
Aldila	NV Green 65	X	66.3	275	46	22	2.1	3.98	45"	101	99	104	110	116
UST Mamiya	ProForce V2 75	S	71.8	256	40	15	2.7	2.73	45"	101	99	104	110	117
Graphite Design	Tour AD MT 7	S	69.9	264	31	14	2.2	3.18	45"	101	99	104	110	117
Graphite Design	Tour AD MJ 7	S	70.1	263	-	-	-	3.11	45"	101	99	104	111	117
Grafalloy	ProLaunch Blue 65	X	64.1	266	-	-	-	3.27	45"	102	99	104	111	117
Graphite Design	Tour AD MT 6	X	62.3	266	29	18	1.6	3.24	45"	102	100	105	111	117
Graphite Design	Tour AD DI 6	X	63.2	267	31	18	1.7	3.24	45"	102	100	105	111	117
Graphite Design	Tour AD MJ 6	X	62.9	267	-	-	-	3.24	45"	102	100	105	111	117
Graphite Design	Tour AD BB 7	S	71.2	263	28	15	1.9	2.92	45"	103	101	106	112	118
Aldila	VS Proto by You 80	S	77.9	257	40	17	2.4	2.57	45"	103	101	106	112	118
Graphite Design	Tour AD DI 7	S	70.6	266	29	17	1.7	3.05	45"	103	101	106	112	118
Graphite Design	Tour AD MJ 8	S	82.3	261	-	-	-	2.65	45"	104	102	107	113	119
Aldila	NV Green 75	X	75.5	273	44	26	1.7	3.30	45"	104	102	107	113	120
Graphite Design	Tour AD GP 7	S	72.3	265	-	-	-	2.83	45"	104	102	107	113	120
Graphite Design	Tour AD BB 6	X	64.1	270	25	16	1.6	3.12	45"	104	102	107	113	120
Graphite Design	Tour AD GP 8	S	81.1	264	-	-	-	2.71	45"	105	103	108	115	121
Graphite Design	Tour AD M9003 6	X	65.8	274	-	-	-	3.15	45"	105	103	108	115	121
Graphite Design	Tour AD GP 6	X	65.5	273	-	-	-	3.01	45"	106	104	109	116	122
Graphite Design	Tour AD MJ 7	X	69.7	276	-	-	-	3.14	45"	106	104	109	116	122
Graphite Design	Tour AD MT 7	X	71.4	277	32	17	1.9	3.11	45"	107	105	110	116	123
Graphite Design	Tour AD M9003 7	S	73.2	266	-	-	-	2.47	45"	107	105	110	116	123
Graphite Design	Tour AD BB 7	X	72.5	278	31	14	2.2	2.99	45"	108	106	111	118	124
Graphite Design	Tour AD DI 7	X	71.9	278	34	20	97	2.97	45"	108	106	111	118	124
Graphite Design	Tour AD GP 7	X	73.6	279	-	-	-	2.89	45"	109	107	113	119	126
Graphite Design	Tour AD MJ 8	X	81.2	276	-	-	-	2.71	45"	109	107	113	119	126

DRIVER SHAFTS LISTED BY DSFI RATING

Manufacturer	Shaft	Flex	Shaft Weight (g)	Freq. (cpm)	Butt Deflect. (oz.)	Tip Deflect. (.oz.)	T/B Ratio	Torque Cut (deg)	Length (in.)	DSFI	3/4 Swing	Fast Tempo	Medium Tempo	Slow Tempo
Graphite Design	Tour AD GP 8	X	80.9	279	-	-	-	2.68	45"	111	109	114	121	128
Graphite Design	Tour AD M9003 7	X	74.7	275	-	-	-	2.43	45"	111	109	114	121	128

#5-IRON STEEL SHAFTS LISTED BY DSFI RATING

Manufacturer	Shaft	Flex	Shaft Weight (g)	Freq. (cpm)	Butt Deflect. (oz.)	Tip Deflect. (.oz.)	T/B Ratio	Torque Cut (deg)	Length (in.)	DSFI	3/4 Swing	Fast Tempo	Medium Tempo	Slow Tempo
Apollo	Shadow Lite Steel	L	87.3	271	61	36	1.7	2.50	37”	74	73	77	81	86
Apollo	Acculite 75	R	76.6	265	52	32	1.6	2.57	38"	75	73	77	81	86
Apollo	Acculite 75	S	76.7	275	57	35	1.6	2.42	38"	78	77	81	86	90
KBS	Tour 90 Parallel	R	89.3	274	-	-	-	2.41	38"	78	77	81	86	90
Apollo	Shadow Lite Steel	A	94.6	277	62	34	1.8	2.38	38”	79	78	82	86	91
Apollo	Standard Stepped Steel	L	101.3	282	65	44	1.5	2.20	37”	79	78	82	87	91
FST	FST 90	A	88.3	279	63	38	1.7	2.33	38"	80	79	83	87	92
FST	Pro 115	A	98.1	279	63	41	1.5	2.28	38"	81	79	83	88	93
True Temper	XP95 39” Taper	R300	93.1	283	63	41	1.5	2.24	38"	82	80	84	89	94
KBS	C-Taper Lite Parallel	R	92.1	285	-	-	-	2.20	38”	83	81	85	90	95
Apollo	Phantom	R	90.9	286	65	41	1.5	2.23	38"	83	81	85	90	95
Apollo	Acculite 95	R	92.9	286	67	40	1.7	2.21	38"	83	81	86	91	96
FST	FST 90	R	90.6	287	65	41	1.6	2.22	38"	83	82	86	91	96
Apollo	Standard Stepped Steel	A	106.0	285	65	40	1.6	2.12	38”	84	82	86	91	96
FST	Pro 115	R	99.9	288	67	43	1.6	2.18	38"	84	82	86	91	97
KBS	C-Taper, parallel	R	103.9	286	69	46	1.5	2.09	38"	84	82	87	92	97
KBS	Tour Parallel (2 1/8” tip)	R	99.3	288	-	-	-	2.17	38"	84	82	87	92	97
True Temper	XP105 39” Taper	R300	99.8	286	65	48	1.4	2.05	38"	84	83	87	92	97
KBS	Tour 90 Parallel	S	89.2	289	-	-	-	2.17	38"	85	84	88	93	98
Apollo	Standard Stepped Steel	R	110.7	292	68	42	1.6	2.03	38”	86	85	89	94	99
FST	FST 115	A	97.8	296	72	41	1.8	2.16	38"	86	85	89	94	99
KBS	Tour Parallel (3 1/8” tip)	R	99.3	293	-	-	-	2.08	38"	86	85	89	94	99
Apollo	Phantom	S	92.3	295	69	46	1.5	2.07	38"	87	85	89	95	100
FST	Pro 115	S	95.4	296	68	44	1.5	2.09	38"	87	85	90	95	100
Apollo	Acculite 85	R	84.4	297	66	39	1.7	2.12	38”	87	85	90	95	100
Apollo	Acculite 95	S	94.5	295	70	44	1.6	2.02	38"	87	86	90	95	100
Apollo	Shadow Lite	R	96.7	302	-	-	-	2.09	38"	88	86	90	96	101
True Temper	XP95 39” Taper	S300	94.0	297	69	45	1.5	2.05	38"	88	86	90	96	101
FST	Pro 125	S	103.8	298	72	46	1.6	2.05	38"	88	86	91	96	101
True Temper	Dynamic Gold Taper	R300	115.6	295	80	59	1.4	1.75	37.5”	88	87	91	96	102
FST	FST 115	S	96.4	301	75	42	1.8	2.08	38"	89	87	91	97	102
KBS	C-Taper Lite Parallel	S	101.3	298	-	-	-	1.95	38”	89	87	91	97	102
KBS	Tour Parallel (4 1/8” tip)	R	99.3	298	-	-	-	1.99	38"	89	87	91	97	102
FST	FST 115	R	99.4	302	74	43	1.7	2.07	38"	89	87	92	97	102
KBS	C-Taper Lite 39.5” Taper	R	96.9	299	71	51	1.4	1.96	38"	89	87	92	97	102
KBS	C-Taper Lite 39.5” Taper	S	99.8	300	72	53	1.4	1.91	38"	90	88	92	98	103
FST	Pro 115	X	97.0	303	73	46	1.6	1.99	38"	90	88	93	98	103

#5-IRON STEEL SHAFTS LISTED BY DSFI RATING

Manufacturer	Shaft	Flex	Shaft Weight	Freq.	Butt Deflect.	Tip Deflect.	T/B Ratio	Torque Cut	Length	DSFI	3/4 Swing	Fast Tempo	Medium Tempo	Slow Tempo
Apollo	Standard Stepped Steel	S	114.2	302	69	44	1.6	1.90	38”	90	89	93	99	104
True Temper	Dynamic Gold	R300	110.9	304	83	53	1.6	1.80	37.5”	91	89	93	99	104
KBS	Tour 39.5” Taper	R	99.2	306	74	50	1.5	2.01	38"	91	89	93	99	104
FST	Pro 125	X	104.3	306	76	47	1.6	1.98	38"	91	89	94	99	105
Apollo	Acculite 85	S	87.3	306	67	41	1.6	1.96	38”	91	89	94	99	105
Apollo	Black Steel	R	114.8	306	71	46	1.5	1.92	38"	91	90	94	100	105
Apollo	Standard Stepless Steel	R	109.3	306	71	46	1.5	1.92	38”	91	90	94	100	105
KBS	Tour Parallel (5 1/8” tip)	R	99.3	303	-	-	-	1.91	38"	91	90	94	100	105
KBS	Tour Parallel (2 1/8” tip)	S	108.4	305	-	-	-	2.00	38"	91	90	94	100	105
KBS	C-Taper, parallel	S	114.6	307	72	51	1.4	1.88	38"	92	90	95	100	106
KBS	Tour-V 39” Taper	R	95.0	306	72	51	1.4	1.84	38"	92	90	95	101	106
Apollo	Spectre Lite Steel	R	95.9	312	72	41	1.8	1.96	38”	93	91	96	101	107
KBS	C-Taper Lite Parallel	X	106.6	309	-	-	-	1.86	38”	93	91	96	101	107
KBS	Tour Parallel (3 1/8” tip)	S	108.4	310	-	-	-	1.92	38"	93	91	96	101	107
FST	FST 115	X	98.1	312	78	46	1.7	1.91	38"	93	91	96	102	107
KBS	C-Taper	R+	106.7	309	68	49	1.4	1.78	38"	94	92	97	102	108
KBS	C-Taper	R	100.5	309	69	50	1.4	1.76	38"	94	92	97	102	108
FST	FST 125	S	104.9	313	79	48	1.6	1.86	38"	94	92	97	103	108
KBS	C-Taper Lite 39.5” Taper	X	105.5	311	76	55	1.4	1.79	38"	94	92	97	103	108
True Temper	Multi-Step Lite	R	109.8	318	76	44	1.7	1.90	38"	95	93	98	104	110
KBS	C-Taper, parallel	X	117.6	315	80	53	1.5	1.80	38”	95	93	98	104	110
KBS	Tour Parallel (4 1/8” tip)	S	108.4	315	-	-	-	1.84	38"	95	93	98	104	110
KBS	Tour Parallel (2 1/8” tip)	X	112.1	316	-	-	-	1.89	38"	95	93	98	104	110
Apollo	Standard Stepless Steel	S	110.5	316	73	50	1.5	1.81	38”	96	94	98	104	110
Apollo	Black Steel	S	117.1	318	76	51	1.5	1.79	38"	96	94	99	105	111
KBS	Tour Parallel (3 1/8” tip)	X	112.1	321	-	-	-	1.81	38"	97	95	100	105	111
KBS	Tour-V 39” Taper	S	101.7	318	79	54	1.5	1.77	38"	97	95	100	105	111
True Temper	Dynamic Gold	S300	114.4	320	91	56	1.6	1.66	37.5”	97	95	100	106	111
Project X	Project X steel	5.5	106.4	321	89	64	1.4	1.60	37.5”	98	96	101	107	113
KBS	Tour 39.5” Taper	S	110.2	322	79	55	1.4	1.76	38"	98	96	101	107	113
KBS	Tour Parallel (5 1/8” tip)	S	108.4	320	-	-	-	1.76	38"	98	96	101	107	113
True Temper	Dynamic Gold Taper	S300	121.0	321	88	65	1.4	1.58	37.5”	98	96	101	107	113
Apollo	Spectre Lite Steel	S	98.4	324	75	47	1.6	1.78	38”	98	96	101	107	113
True Temper	Multi-Step Lite	S	107.6	327	81	46	1.8	1.83	38"	99	97	102	108	113
KBS	C-Taper	S	110.3	321	73	54	1.4	1.63	38"	99	97	102	108	114
KBS	C-Taper	S+	113.6	323	73	54	1.4	1.63	38"	100	98	103	109	115
KBS	Tour Parallel (4 1/8” tip)	X	112.1	326	-	-	-	1.73	38"	100	98	103	109	115
True Temper	Dynamic Gold	X100	114.9	329	93	58	1.6	1.62	37.5”	100	98	103	109	115
FST	FST 125	X	108.5	328	83	53	1.6	1.72	38"	100	98	103	109	115
True Temper	Dynamic Gold Taper	X100	119.8	330	90	69	1.3	1.51	37.5”	102	100	105	111	117
KBS	Tour Parallel (5 1/8” tip)	X	112.1	331	-	-	-	1.66	38"	102	100	105	111	117
KBS	Tour-V 39” Taper	X	110.1	330	84	58	1.4	1.61	38"	102	100	105	111	118
Project X	Project X steel	6.5	112.5	332	92	67	1.4	1.50	37.5”	103	100	106	112	118
KBS	C-Taper	X	118.1	332	77	56	1.4	1.56	38"	103	101	107	113	119

#5-IRON GRAPHITE SHAFTS LISTED BY DSFI RATING

Manufacturer	Shaft	Flex	Shaft Weight (g)	Freq. (cpm)	Butt Deflect. (oz.)	Tip Deflect. (.oz.)	T/B Ratio	Torque Cut (deg)	Length (in.)	DSFI	3/4 Swing	Fast Tempo	Medium Tempo	Slow Tempo
UST Mamiya	iRN	L	51.3	240	-	-	-	4.96	37.5”	61	60	63	67	71
Apollo	Shadow FL	L	50.1	254	54	34	1.6	4.92	37.5"	65	64	67	71	75
iBella	Obsession	L	56.9	255	-	-	-	3.88	37.5”	65	64	67	71	75
Acer	Velocity	L	54.5	247	48	35	1.4	4.05	37.5”	66	64	68	72	76
Apollo	Shadow UL Graphite	L	56.6	250	55	39	1.4	3.94	37.5”	67	66	69	73	77
Graman	M70 LL/L	LL	58.4	254	53	32	1.7	4.10	37.5"	67	66	69	74	78
iBella	Obsession	L	56.9	255	-	-	-	3.88	37.5”	68	66	70	74	78
Graman	Crossfire	L	69.7	268	61	37	1.6	5.15	37.5"	68	67	70	74	78
Acer	Velocity	A	57.8	251	50	30	1.7	4.29	38.5”	68	67	70	74	79
Aldila	VL	L	65.8	270	68	52	1.3	4.46	36.5”	68	67	70	74	79
Graman	R70	L	59.2	270	60	36	1.7	4.60	37.5"	70	69	72	76	81
Apollo	Shadow FL	A	52.6	261	58	31	1.9	4.53	38.5"	70	69	72	77	81
UST Mamiya	iRN	A	58.4	259	-	-	-	4.35	38.5”	70	69	72	77	81
Graman	M70 A/L	L	60.3	268	59	37	1.6	4.29	37.5"	71	69	73	77	81
Graman	M70 LL/L	L	58.9	262	55	32	1.7	3.83	37.5"	71	69	73	77	81
Apollo	Shadow UL Graphite	A	57.0	253	55	34	1.6	3.72	38.5”	71	69	73	77	81
Graman	Crossfire	A	72.3	270	60	34	1.8	4.99	38.5"	71	70	73	78	82
Apollo	Shadow Graphite	L	66.7	268	62	44	1.6	4.05	37.5”	71	70	73	78	82
Apollo	Shadow FL	R	53.5	271	62	32	1.9	4.55	38.5"	73	71	75	79	84
Graphite Design	G-Tech A&L	L	64.8	267	53	31	1.7	3.56	37.5"	73	71	75	80	84
Aldila	VL	A	68.1	274	70	52	1.4	4.04	37.5”	73	72	75	80	84
Graman	R70	A	61.7	270	61	34	1.8	4.41	38.5"	73	72	75	80	84
Acer	Velocity	R	60.8	270	55	32	1.7	4.16	38.5”	74	72	76	81	85
Graman	M70 A/R	A	64.5	274	65	36	1.8	4.36	38.5"	74	73	77	81	85
Graman	M70 A/L	A	63.1	271	58	33	1.8	4.11	38.5"	74	73	77	81	85
UST Mamiya	Competition Series	L	66.0	283	73	49	1.5	4.31	37.5”	74	73	77	81	86
Aldila	VX	R	76.2	279	74	45	1.6	3.97	37.5”	75	73	77	81	86
UST Mamiya	iRN	R	62.1	272	-	-	-	4.08	38.5”	75	73	77	81	86
UST Mamiya	Recoil 660	A	60.9	272	-	-	-	3.99	38.5"	75	73	77	81	86
Apollo	Shadow Graphite	A	69.8	271	64	40	1.6	3.99	38.5”	75	73	77	82	86
UST Mamiya	MP6	R	60.7	273	63	40	1.6	3.89	38.5"	75	74	78	83	87
Graman	M65	L	55.4	283	68	39	1.7	3.98	37.5"	76	74	78	82	87
Apollo	Shadow UL Graphite	R	58.5	273	63	35	1.8	3.87	38.5”	76	74	78	83	87
Apollo	Shadow FL	S	53.3	280	64	31	2.1	4.36	38.5"	76	74	78	83	87
UST Mamiya	Competition Series	A	67.0	278	71	41	1.7	4.18	38.5”	76	74	78	83	87
Grafalloy	ProCustom	L	60.4	275	63	33	1.9	3.25	37.5”	77	75	79	83	88
Graphite Design	G-Tech A&L	A	67.2	270	52	36	1.4	3.44	38.5"	77	75	79	84	88
Graman	Crossfire	R	76.0	291	70	40	1.8	4.96	38.5"	77	75	79	84	88
Apollo	Shadow Graphite	R	75.1	284	70	43	1.6	4.22	38.5”	78	76	80	84	89
Graman	R70	R	68.2	287	66	37	1.8	4.31	38.5"	78	76	80	85	90
Graman	M65	R	64.3	287	70	41	1.7	4.39	38.5"	78	76	80	85	89
Graman	M65	A	57.6	284	66	37	1.8	3.87	38.5"	78	77	81	86	91
Graman	M70 A/R	R	64.6	284	68	37	1.8	4.04	38.5"	78	77	81	85	90
UST Mamiya	Recoil 95 39.5” Taper	R	90.0	284	-	-	-	3.69	38"	78	77	81	85	90
Apollo	Shadow UL Graphite	S	58.3	280	67	33	2.0	3.73	38.5”	78	77	81	85	90

#5-IRON GRAPHITE SHAFTS LISTED BY DSFI RATING

Manufacturer	Shaft	Flex	Shaft Weight (g)	Freq. (cpm)	Butt Deflect. (oz.)	Tip Deflect. (.oz.)	T/B Ratio	Torque Cut (deg)	Length (in.)	DSFI	3/4 Swing	Fast Tempo	Medium Tempo	Slow Tempo
Graman	M70 R/S	R	67.7	286	68	39	1.7	4.14	38.5"	78	77	81	85	90
Acer	Velocity	S	65.1	283	62	32	1.9	3.91	38.5”	78	77	81	85	90
SK Fiber	Tour Trac 75	A	70.8	275	-	-	-	3.30	38.5"	79	77	81	86	90
UST Mamiya	MP6	S	62.8	285	-	-	-	4.04	38.5"	79	77	81	86	90
UST Mamiya	iRN	S	63.7	287	-	-	-	3.98	38.5”	79	78	82	86	91
UST Mamiya	Recoil 760 ES SMAC	F3	61.7	287	-	-	-	4.02	38.5”	79	78	82	86	91
Aldila	VX	S	77.6	292	80	49	1.6	3.59	37.5”	80	78	82	87	92
Grafalloy	ProCustom	A	62.0	278	63	35	1.8	2.91	38.5”	80	80	84	89	94
Graman	Crossfire	S	76.9	299	73	42	1.7	4.61	38.5"	80	79	83	87	92
UST Mamiya	Recoil 660	R	64.0	288	-	-	-	3.85	38.5”	80	78	82	87	92
UST Mamiya	Competition Series	R	70.5	296	77	48	1.6	4.28	38.5”	81	79	83	88	93
Graman	M65	S	64.3	295	73	42	1.7	4.06	38.5"	81	80	84	88	93
Apollo	Shadow Graphite	S	75.8	292	72	43	1.7	3.81	38.5”	81	80	84	88	93
Grafalloy	ProCustom	R	63.7	283	66	35	1.9	3.45	38.5”	81	80	84	88	93
Graman	M70 R/S	S	68.1	296	70	40	1.8	3.89	38.5"	82	80	85	89	94
Graman	R70	S	70.1	298	75	41	1.8	4.17	38.5"	82	80	84	89	94
Graphite Design	G-Tech R&S	R	70.3	289	62	35	1.8	3.44	38.5"	82	81	85	90	94
SK Fiber	Tour Trac 75	R	72.3	284	-	-	-	3.23	38.5"	82	81	85	90	94
UST Mamiya	Recoil 95 39.5” Taper	S	88.0	299	-	-	-	3.69	38"	82	81	85	90	95
Aerotech	SteelFiber i95 Taper	R	90.7	285	65	46	1.4	3.08	38.5"	83	81	85	90	95
Aerotech	SteelFiber i70	R	67.0	283	63	41	1.5	2.91	38.5"	83	82	86	91	96
Aerotech	SteelFiber i80	R	76.6	283	63	42	1.5	2.33	38.5"	84	82	86	91	96
UST Mamiya	Recoil 680	S	73.3	298	-	-	-	3.65	38.5”	84	82	86	91	96
UST Mamiya	Recoil 110 39.5” Taper	S	100.8	300	-	-	-	3.41	38"	84	82	87	92	97
UST Mamiya	Competition Series	S	71.3	306	81	49	1.7	4.04	38.5”	84	83	87	92	97
Aerotech	SteelFiber i110 Taper	R	102.4	287	66	50	1.3	2.91	38.5"	84	83	87	92	97
Grafalloy	ProCustom	S	64.4	293	70	39	1.8	3.14	38.5”	85	83	87	92	98
Aerotech	SteelFiber i110	R	99.7	288	69	48	1.4	2.77	38.5"	85	84	88	93	98
Aerotech	SteelFiber i80 Taper	R	81.0	286	66	41	1.6	2.61	38.5"	86	84	88	94	99
Aerotech	SteelFiber i95	R	86.0	295	66	47	1.4	2.95	38.5"	86	85	89	94	99
SK Fiber	Tour Trac 75	S	75.5	300	-	-	-	3.24	38.5”	86	84	89	94	99
Graphite Design	G-Tech R&S	S	71.8	303	66	36	1.8	3.20	38.5"	87	86	90	95	100
UST Mamiya	Recoil 780 ES SMAC	F4	77.7	305	-	-	-	3.34	38.5"	87	86	90	95	100
Grafalloy	ProLaunch Blue	R	74.0	286	65	33	2.0	2.39	38.5”	87	86	90	95	101
Aerotech	SteelFiber i80	S	76.9	296	70	44	1.6	2.79	38.5"	88	86	90	96	101
Aerotech	SteelFiber i70	S	67.5	298	67	42	1.6	2.87	38.5"	88	86	90	96	101
Aerotech	SteelFiber i95	S	85.1	305	72	47	1.5	3.19	38.5"	88	86	91	96	101
Aerotech	SteelFiber i95 Taper	S	91.1	303	74	45	1.6	3.00	38.5"	89	87	91	96	102
Aerotech	SteelFiber i110	S	98.4	300	72	53	1.4	2.83	38.5"	89	87	91	97	102
Aerotech	SteelFiber i110 Taper	S	100.7	296	69	53	1.3	2.60	38.5"	89	87	92	97	102
Aerotech	SteelFiber i80 Taper	S	79.3	298	73	46	1.6	2.60	38.5"	90	88	92	98	103
Grafalloy	ProLaunch Blue	S	75.1	301	77	43	1.8	2.40	38.5”	92	90	95	100	106

HYBRID SHAFTS LISTED BY DSFI RATING

Manufacturer	Shaft	Flex	Shaft Weight (g)	Freq. (cpm)	Butt Deflect. (oz.)	Tip Deflect. (.oz.)	T/B Ratio	Torque Cut (deg)	Length (in.)	DSFI	3/4 Swing	Fast Tempo	Medium Tempo	Slow Tempo
UST Mamiya	hYB Hybrid	L	51.6	242	-	-	-	4.75	38.5”	64	63	66	70	74
UST Mamiya	Recoil ES 55 Hybrid	L	50.1	238	-	-	-	4.20	39"	65	64	67	71	75
UST Mamiya	hYB Hybrid	A	61.0	254	-	-	-	4.55	39.5”	71	69	73	77	81
UST Mamiya	Recoil ES 65 Hybrid	A	60.2	249	-	-	-	3.97	40"	72	70	74	78	82
Aldila	VL Hybrid	L	63.7	262	56	30	1.9	3.44	38.5"	74	73	77	81	86
UST Mamiya	hYB Hybrid	R	63.3	266	-	-	-	4.36	39.5”	75	73	77	81	86
UST Mamiya	MP5 Hybrid	R	54.9	283	65	37	1.8	5.69	39.5"	75	74	77	82	87
Aldila	VL Hybrid	A	66.7	263	54	27	2.0	3.52	39.5"	77	75	79	84	89
UST Mamiya	hYB Hybrid	S	65.0	277	-	-	-	4.45	39.5”	77	76	80	84	89
UST Mamiya	MP5 Hybrid	S	57.8	293	70	41	1.7	5.36	39.5"	79	77	81	86	91
Aldila	NVS Orange 85 Hybrid	R	71.0	259	54	29	1.9	2.82	39.5”	79	78	82	86	91
Aldila	VX Hybrid	R	68.1	272	58	30	1.9	3.43	39.5"	80	78	82	87	92
UST Mamiya	Recoil ES 75 Hybrid	S	69.5	261	-	-	-	3.11	40"	80	78	82	87	92
Aldila	NV Green 85 Hybrid	R	73.5	263	56	41	1.4	2.80	39.5”	81	79	83	88	93
Aldila	VX Hybrid	S	70.3	284	63	32	2.0	3.45	39.5"	83	82	86	91	96
KB Steel	Hybrid	R	88.0	276	55	39	1.4	2.19	39.5”	84	83	87	92	97
Aldila	NV 85 Green Hybrid	S	73.5	276	61	43	1.4	2.73	39.5”	85	83	88	93	98
Graphite Design	Tour AD DI 75 Hybrid	R	72.5	268	-	-	-	2.75	40.5"	85	83	88	93	98
Aldila	NVS Orange 85 Hybrid	S	74.6	278	58	34	1.7	2.67	39.5”	86	84	89	94	99
UST Mamiya	Recoil ES 85	S	76.1	280	-	-	-	3.09	40"	86	84	89	94	99
Graphite Design	Tour AD DI 75 Hybrid	S	73.1	274	-	-	-	2.73	40.5"	87	85	90	95	100
Aldila	VS Proto by You 80 Hybrid	R	75.0	271	56	38	1.5	2.03	39.5”	89	87	91	96	102
Graphite Design	Tour AD DI 85 Hybrid	R	81.1	267	-	-	-	2.17	40.5"	89	87	92	97	102
UST Mamiya	Recoil ES 95	X	81.8	289	-	-	-	2.91	40"	89	87	92	97	102
Aldila	VS Proto by You 80 Hybrid	S	77.0	278	59	40	1.5	2.06	39.5”	91	89	93	99	104
Graphite Design	Tour AD DI 75 Hybrid	X	74.3	287	-	-	-	2.78	40.5"	91	89	94	99	105
Aldila	VS Proto by You 95 Hybrid	R	82.7	269	55	33	1.7	1.67	39.5”	91	90	94	100	105
Graphite Design	Tour AD DI 95 Hybrid	S	91.7	282	-	-	-	2.20	40.5"	94	92	97	102	108
Graphite Design	Tour AD DI 85 Hybrid	S	81.4	282	-	-	-	2.15	40.5"	94	92	97	103	108
Graphite Design	Tour AD DI 105 Hybrid	S	99.0	281	-	-	-	2.07	40.5"	95	93	97	103	109
Aldila	VS Proto by You 95 Hybrid	S	83.6	281	59	41	1.4	1.68	39.5”	95	93	98	104	110
Graphite Design	Tour AD DI 105 Hybrid	X	101.8	289	-	-	-	2.11	40.5"	97	95	100	106	111
Graphite Design	Tour AD DI 85 Hybrid	X	82.3	292	-	-	-	2.16	40.5"	97	95	100	106	112
Graphite Design	Tour AD DI 95 Hybrid	X	92.6	292	-	-	-	2.11	40.5"	98	96	101	107	113