



CLUBMATE **GOLF** AUSTRALIA
GOLF CLUB COMPONENTS

eTECHREPORT

October-November 2005 eTECHreport - Welcome!

- **What I've Learned About Golf Clubs and Fitting – In a Nutshell**

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- **Groundbreaking on New TWGT R&D Center by Tom Wishon**

The floor plan and design is set, the plans are complete and the shovel is in the ground. By early spring 2006, a proper "home" for TWGT's R&D work will be a reality in the construction of our brand new research and development center. [\[continues below\]](#)

- **Durango, Colorado Displaces Carlsbad, California and Japan as the Center of Innovation in Golf Club Design**

The following is the latest press release sent by TWGT to all of the members of the golf media who work in the area of, or write about golf equipment. [\[continues below\]](#)

- **Fitting the Beginner or Inconsistent Golfer**

Several times in our promotion of the benefits of real custom fitting, we have stated that "custom fitting is for ALL golfers, not just the more accomplished players." But is custom fitting able to help beginning golfers, or more specifically, golfers who are so inconsistent that they have yet to develop a consistent pattern of "misses"? [\[continues below\]](#)

- **Tiger Woods' Comments on Fitting and Golf Equipment**

The Golf Channel's veteran reporter Kelly Tilghman recently had the opportunity to conduct a sit-down interview with Tiger Woods [\[continues below\]](#)

- **Calibration Clubheads Available for Accurate Loft and Lie Bending**

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What I've Learned About Golf Clubs and Fitting – In a Nutshell

It's a darn good thing I still feel the same as I did when I was 30-something (knock on wood!) because once in a while when I actually think chronologically of how long I have been working and studying in the field of golf club and clubfitting technology, I could get the notion that I am ascending now into "old timer" status! Taking a page from Huxley's book despised by high school students far and wide, "The Uses of the Past", I like to think that these 33 years of clubmaking, fitting and design experience I now have under my belt have taught me something that I can pass along to interested clubmakers as a way to save them the pain and stress of figuring it out for themselves. As a result, I would like to stop for a moment in the midst of our ongoing probe into the truths and myths of golf club and clubfitting technology to offer a few of the things I have learned over the course of my work in this great field.

- It is far better to err on the side of more flexibility in the shaft, lighter total weight, higher swingweight/MOI, more loft and shorter length in your fitting for 98% of the golfers you encounter than in the other direction for each of these fitting parameters. Or from another direction, the longer the length, stronger the loft, the heavier the total weight, the lighter the swingweight/MOI and the stiffer the shaft, the harder the club will be to hit for any golfer. And what's more, the higher the golfer's handicap and the lower their frequency of play/practice, the more this rule will apply to your clubfitting.
- The less the golfer knows about shafts, the more successful the shaft selection part of their fitting will be. The more the golfer thinks they know about shafts, the more difficult the selection of their shafts will be.
- Loft is by far the most influential fitting parameter for driver distance and trajectory for any golfer over the shaft, the head's CG and the head's MOI. Club length is number two. But if you do not get the club's swingweight/MOI matched well for the golfer's strength and swing rhythm/tempo, all the good work you do with loft and length will never succeed.
- At least 95% of all golfers play with woods which are too long for their swing ability.
- The higher the handicap of the player, the more proper custom fitting will improve his or her enjoyment of the game.
- The stronger the upper body, the arms and the hands of the golfer, the higher the swingweight will need to be to maximize their percentage of on-center hits. Add a fast tempo and fast back to downswing transition to this and the total weight will likely need to be increased as well.
- The slower the swing speed, the fewer conventional irons should be incorporated into the custom fit set.
- It is far easier to increase trajectory for a golfer than to decrease it. This is because 98% of all golfers who hit the ball "too high" do so because of a swing error that delivers the clubhead to impact well in front of the hands. No clubfitting change under the sun will be able to overcome such a swing error.
- When in doubt, make the swingweight 2 points higher than you think it should be. If you did a good job in fitting the length, loft, face angle, and total weight of the club, you'll never get hurt with this decision.
- Lead tape is for changing the swingweight/MOI of the club, not for altering the center of gravity of the clubhead or the shape of the shot.
- For 99% of all golfers, increasing club length will do far more to detract from accuracy than it ever will to increase distance.

- Only if the golfer has the swing tempo and rhythm of Tommy Aaron and Sam Snead combined should you ever agree to build the driver longer than 44". Possible exception – some men who have played the center position in college or professional basketball.
- If you only focus on the proper loft, length, lie (irons), face angle (woods) and swingweight/MOI in your fitting, 98% of all golfers will walk away with 98% of their possible improvement in distance and accuracy.
- A clubhead with the correct loft, length, lie (irons), face angle (woods) and swingweight/MOI which is made from a tree growing in your back yard will perform better than a clubhead made from the latest NASA space-age material which has the wrong loft, length, lie (irons), face angle (woods) and swingweight/MOI for the golfer.
- A golfer's opinion of the quality of a club is directly proportional to the number of times they have seen/heard of the club in a magazine, on television or from another golfer whose playing ability they are intimidated by. As a clubmaker you can only offset these factors by campaigning to educate and custom fit the better golfers in your area.
- Unless the effect of a golf club design factor on ball flight is explainable by physics, it does not exist as fact and thus stands as a myth. However, if the effect of the design factor which is substantiated by physics does not produce a change in ball flight which is visible to the golfer, it is not worth including in the fitting recommendation. This is what we refer to as a measurable difference with not significant performance difference.
- If you read it in an advertisement or heard it on a television commercial, be skeptical and consider the source and the science behind it when it comes to performance claims from equipment companies.
- No golfer on the planet can hope to play their best with standard made clubs bought off the rack. Even if a 4 hour fitting session ends up proving that the golfer needs exactly the same specifications as what could have been bought off the rack in a standard club, at least the golfer now KNOWS that what he has is the best for his game/swing, and will then play with more confidence.
- With exception of most family members, best friends, and those who will have had to the time to get to know you personally, 99% of the rest of your customers will believe the quality of your clubmaking is directly proportional to the price you charge for your work.
- 99% of the sales staff members working at golf retail stores know far less than you did about golf clubs and their performance when you reached the point you decided you really liked clubmaking.
- 98% of the sales reps working for major golf club companies know little to nothing about the real technical performance of golf clubs, regardless if they are speaking about their company's or a competitor's golf clubs.
- When you realize that what little amount of training of golf retail sales people is done by golf club company sales reps, 98% of the golfers who visit a golf retail facility to buy their clubs are never going to receive the best golf clubs for their playing needs.
- In no way is the quality and performance of a clubhead or shaft ever ensured by having been manufactured by a large, respected production factory. Quality and performance is far more in the hands and mind of the designer and his watchdogging of the clubhead's production than it is in the hands of the production

factory. What you DO get from a large, respected clubhead or shaft production factory is consistency – consistently good if the design is good, or consistently mediocre if the design is not so good.

- A clubmaker's ability to fit and build custom made golf clubs in no way has anything to do with his or her own playing ability. It has everything to do with their passion to learn and the quality of the source of their technical information.
- Money and the depth of the desire for its acquisition is the greatest reason not to be involved in the business of golf equipment.

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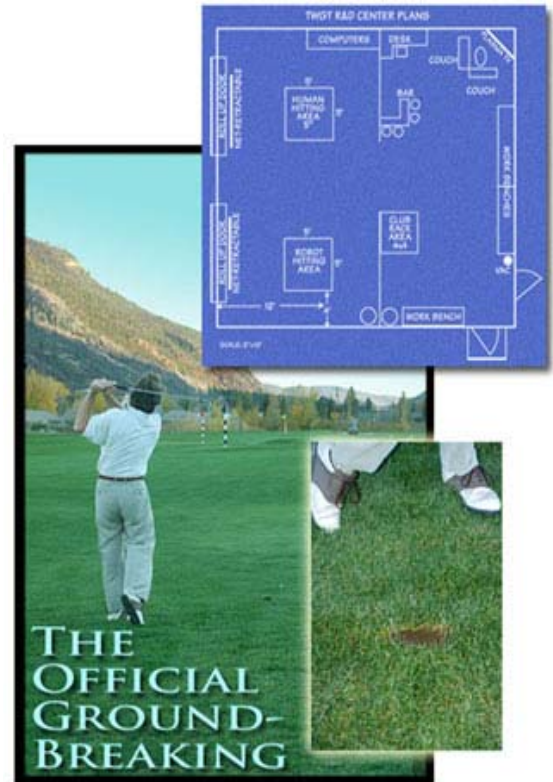
Groundbreaking on New TWGT R&D Center

The floor plan and design is set, the plans are complete and the shovel is in the ground. By early spring 2006, a proper “home” for TWGT’s R&D work will be a reality in the construction of our brand new research and development center. Home for the new TWGT R&D center will be at one of Colorado’s premier golf facilities, the Dalton Ranch Golf Club. Located 6 miles north of Durango on US Highway 550, Dalton Ranch is a perennial “Top Ten” golf facility among Colorado golf courses and has been ranked GolfWeek magazine’s national listing of the Top Courses You Can Play.

The new TWGT R&D center will comprise 1200 square feet under roof and will house two separate side by side hitting bays, once for our hitting robot and the other for human hit-testing. Side by side insulated roll up doors will allow hit testing to be done outdoors into the full length of the Dalton Ranch practice range. In the winter, full hitting nets will be dropped in front of the roll up doors to allow full indoor testing to take place. Technology items which will be a regular part of the R&D facility will be an array of different launch monitors, Smart Swing Intelligent clubs, high speed video camera, electronic CG and MOI measurement machines and computer modeling software for shot analysis. In addition there will be a complete clubmaking workshop and computer workstation area which will make the facility not just the largest, but the best equipped R&D test center in the entire custom clubmaking segment of the golf equipment business.

When not being used for TWGT research, the TWGT R&D facility will be used by Dalton Ranch GC head professional Fal Wood and his staff to offer custom fitting services to their members and daily fee players. “All of us at Dalton Ranch are truly excited that Tom is building such a wonderful facility at our golf course,” said Wood. “Not only will we be able to offer real custom fitting to our members and golfers, but the depth of what my staff and I will learn from the ongoing equipment and fitting research that Tom and his staff will conduct at the facility will make us more knowledgeable golf professionals and Dalton Ranch a unique golf facility, not just in Colorado, but in the entire country.”

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Durango, Colorado Displaces Carlsbad, California and Japan as The Center of Innovation in Golf Club Design

Since opening his company in the mountains of southwest Colorado in 2003, golf equipment design veteran Tom Wishon has conceived, developed and produced more significant golf club design innovations in the last three years than all of the golf clubmaking companies in Carlsbad, CA and Japan combined.

Durango, CO – October 1, 2005 – Durango, Colorado the center for golf club design innovation? Believe it. Since beginning business in early 2003, Tom Wishon Golf Technology has created more significant, real performance enhancing golf club design innovations than all of the golf company residents of Carlsbad, California and Japan combined. With the release of the book, *The Search for the Perfect Golf Club* in April 2005, TWGT is beginning to prove to golfers that real performance changing innovation in golf club design is not the domain of the largest standard made golf club companies in the golf equipment business.

Original Golf Club Design Technology from Carlsbad, California and Japan since 2003

- Taylor Made R7™/R5™ – The first drivers to allow changeable weight distribution movement around the head in an effort to change ball flight. (Note: Tom Wishon was the first to develop a draw-bias woodhead through the movement of mass to the heel side of the head in 1995)
- Callaway Fusion™ - Graphite rear body/Ti front body for different weight distribution in the clubhead (Note: Tom Wishon was the first to develop a woodhead which was constructed of a graphite rear body locked to a metal face/hosel in 1995)
- Titleist Cameron™ / Ping™ - advent of super-size mallet style putter head designs with a higher MOI.
- Nippon Shaft™ – The development of an ultralight steel iron shaft with a raw weight of 90 grams.
- Yonex Golf™ – The development of a driver with a composite material crown piece said to enhance top crown flexing at impact (however, not all golf club designers/engineers recognize any performance benefit to this development).

Tom Wishon Golf Technology Original Design Technology Since 2003

1. GRT (Graduated Roll Technology) Face Design – 2004

Maintaining the typical vertical roll radius on woods simply results in a very inconsistent launch angle; especially since driver face sizes have increased so much recently. With a traditional 9"-12" vertical roll, the loft at the top and bottom of the face of today's 450-460cc driver heads will create as much as a +/- 3 degree loft up and down the face. Wishon Golf's GRT face design, which drastically reduces the loft variation on woods, generates a far more consistent launch angle than could ever be possible with a typical vertical roll radius woodface design. (Woodheads with a greatly reduced vertical roll are being offered by Tommy Armour Golf Company in 2005.)

[Link to GRT line-art](#) – 99KB PDF

2. MOI Club Matching System – 2003

Building each club in a set to be matched to the MOI of the assembled club is recognized by virtually every mechanical engineer as technically superior to swingweight matching for making each club swing with precisely the same feel. TWGT's MOI matching System is now in use by hundreds of custom clubmakers today to deliver identical club-to-club swing feel for golfers around the world. (No other company has done this.)

[Link to more info](#) | [Link to photo of Period Counter](#) – 212KB JPEG

3. High COR Iron Design Through Variable Thickness, Thin Overall Face Design – 2004

In 2000, Tom Wishon was the first to introduce an ironhead model with a thin-face design in an effort to increase the COR for ironheads. Wishon Golf's acclaimed 770CFE irons have pushed thin-face, higher iron COR design to a new level of off-center shot forgiveness. (A number of thin-face iron models are slated for introduction by other companies in 2006.)

[Link to photo of 770CFE irons](#) – 382KB JPEG | [Link to line art of 770CFE toe with face insert](#) – 64KB PDF

4. Smaller Tip Diameter Graphite and Steel Iron Shaft Design – 2004

The 0.335" tip diameter utilized on the GI-335 graphite and Series 5-335 Steel shafts match with the TWGT 321Li true iron hybrid clubheads to allow the rear CG location of the 321Li to bend the smaller tip section forward more before impact, generating a higher launch angle. (Since its introduction, other club and shaft companies have begun to follow this unique departure from previous iron shaft design.)

[Link to bend profile graph](#) – 553KB PDF

5. More Rear Located CG Position For Improved Launch Angle – 2003

Wishon Golf was the first to identify how moving the CG farther back from the shaft could generate a higher launch angle for any given loft, through research and subsequent technical articles first published in 2001. Wishon Golf's model 919CCG, was the first driver design to utilize a greater face to back head shape with a large copper back weight to push the CG 38mm to the rear of the clubface. Subsequently the 949G/Ti's rear CG location of 44mm took this design characteristic to a whole new level in 2004.

[Link to photo of 949G/Ti with superimposed measurements](#) – 367KB JPEG

6. First fairway woods with a COR of 0.830 – 2004-2005

Through a combination of a new high strength steel alloy from Carpenter Specialty Metals, forged cup-face construction, and a 0 roll face design, Wishon Golf's 515GRT fairway woods became the first to reach the USGA COR limit. (Two other golf companies have since followed this development.)

[Link to photo of 515GRT 3 & 5](#) – 172KB JPEG | [Link to photo of 515GRT Face measuring 0 roll](#) – 221KB JPEG

7. Putters With Interchangeable Faces for Loft Fitting – 2005

Simply bending the hosel of a putter to change the loft results in a sole angle that no longer allows the putter to sit flat on its sole and square to the target line. This is because loft, sole angle and face angle are forever inter-related. The CLF Series interchangeable loft putters are the first putter designs to allow golfers with differences in their putting strokes to be fit for the best roll of the ball off the face. (No other golf company has done this.)

[Link to photo of CLF Series Putters](#) – 249KB JPEG

8. Rotating Internal Weight Arm to Change the MOI/CG – 2005

Taylor Made may have debuted the first driver head with a moveable weight system, but Wishon Golf's 715CLC is able to offer 60% more weight movement for a greater change in ball flight. This is accomplished through a unique internal weight arm that can be locked into a wide variety of positions. (No other golf company has designed any other form of weight change driver other than through exterior weight ports that only allow 25 grams of weight movement around the head.) [Link to photo of 715CLC with cut-out to weight arm](#) – 273KB JPEG

9. First Titanium Driver to Greatly Increase the Face to Back Dimension to Increase Rear CG Location – 2003

In 2003, golfers and clubmakers both questioned Wishon Golf's reason for significantly changing the driver head shape to be visually deeper from face to back than ever previously designed. With this radical departure in driver

shape, and a massive copper back weight, TWGT proved that if a more rear-located CG was desired for improving launch angle, such a shape was a means to achieve that design goal. (Nike recently introduced their Sasquatch™ model, which takes advantage of this woodhead shape.)

[Link to photo of 919CCG 340cc at address – 322KB JPEG](#) | [Link to photo of 919CCG sole/face – 248KB JPEG](#)

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Fitting the Beginner or Inconsistent Golfer

Several times in our promotion of the benefits of real custom fitting, we have stated that “custom fitting is for ALL golfers, not just the more accomplished players.” But is custom fitting able to help beginning golfers, or more specifically, golfers who are so inconsistent that they have yet to develop a consistent pattern of “misses”?

This subject came up several weeks ago on the TWGT Forum and the variety of opinions posted by the various clubmakers who participated in the thread was interesting enough that we wanted to address the subject in an E-TECHreport so that we could share with all clubmakers how to best approach such a fitting session.

It is pretty easy on the surface to believe if a golfer hooks or pulls as many shots as he slices or pushes that custom fitting won't be able to do much to help. . . . or will it? Stop for a moment and just think about an old adage that has been around clubfitting for a long time – “the longer the length, the heavier the total weight, the stiffer the shaft and the lower the loft, the harder the club will be to hit for ANY golfer.”

Developing any type of repeating swing motion requires a lot of practice and repetition. Teaching a newcomer or a golfer with poor fundamentals all that is necessary to swing the club around their body and return it back to the ball on a reasonably correct swing path without moving the body all over the place is a tough concept to master. But at the same time, swinging the club down on a reasonable path is a lot more difficult to do if the clubs are too long and too heavy. This demonstrates the important interaction between equipment and swing motion.

Fitting inconsistent golfers is not about choosing specifications which correct for specific swing errors as much as it is all about choosing specifications for the clubs which make the learning process and skill acquisition for a reasonably consistent swing path easier and shorter.

If you think like that, then first on the list will be to make sure the set make-up compliments the golfers ability. Thus a typical new set make-up for the inconsistent male golfer which would help make the swing learning process a little easier would be higher lofted and shorter Driver, 5w, 7w or hybrid, 5/6-iron through wedges (9w instead of 5iron or no 5-iron is fine too). For the inconsistent lady golfer, an easier set make-up to allow swing consistency to be achieved sooner might be high lofted shorter driver, 5w, 7w, 9w or hybrid, and 6/7-iron through wedges. The longer and lower lofted clubs can easily come later after the golfer begins to develop more consistency in their swing, which is the kind of flexibility that clubmakers can offer, that already assembled club companies can't.

Second has to be the length of the clubs. No question that the majority of “over the top, outside/in swing paths that can result in a slice, push or even a pulled shot are made worse by the golfer trying to control clubs that are too long for their athletic ability. Men who are inconsistent should not use a 3w longer than 42” with all other woods dropped in 1 inch increments from that. Because iron lengths are always easier to control than wood lengths, the 5-iron can still be set up at 37.5” to 38” with reference to the wrist to floor chart being a decent guideline for iron length fitting.

Third has to be the total weight and swingweight relationship in the clubs for the inconsistent golfer. Gulp...that means lightweight graphite shafts (wood- < 70grams/iron- < 80grams), and that means a little more cost per club to the golfer. Consolation will come in the fact that the beginner or inconsistent golfer's set make-up includes fewer clubs which in turn means a lower total cost for the set than the golfer who is competent enough to benefit from a full set of 13 clubs. However, if the inconsistent golfer is not prepared to head down the path of graphite, don't worry too much – set make up and shorter length will go a long way to helping them gain more consistency in the swing using clubs which are shorter and easier to hit.

If the golfer hits an equal number of off-line shots to the right and left, the face angle really has to be selected to be square. Once the golfer gets to a point where they are missing the ball more to one side of the target than the other, then you can offer a face angle correction for the woods which are hit off-line with a more uniform directional tendency.

While such a fitting outcome will not be the same as it would be for a golfer with more consistency in their mistakes, following the above advice will make the task of developing more consistency much easier than to simply ignore the needs of the beginner or inconsistent golfer. And of course it is a great way to begin an ongoing relationship and help the golfer enjoy the game more.

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Tiger Woods' Comments on Fitting and Golf Equipment

The Golf Channel's veteran reporter Kelly Tilghman recently had the opportunity to conduct a sit-down interview with Tiger Woods. The interview was aired on The Golf Channel in early October and covered a variety of subjects with the world's number one ranked player. Of particular interest in the interview to clubmakers were the responses Tiger made when asked by Tilghman to comment on the importance of equipment to amateur golfers and the state of the golf equipment industry. (Following is an excerpt from The Golf Channel interview with Tiger Woods, as published on iseekgolf.com)

Kelly Tilghman: What is the most important thing that amateurs need to know about equipment these days?

Tiger Woods: Proper fitting, I think the ultimate key is to have the golf clubs fit you, you not fit the club. I try and stress that to all the juniors and even amateurs that I give clinics to, they ask me in Pro Ams, you got to get a club that fits. You don't want a club that's (inaudible) you like to play two degrees upright. It's not going to work. You are not going to get the maximum advantages of that club. The club was not designed to be hit that way. I think that's one of the advantages that I think club fitting has certainly made leaps and bounds is that they are able to fit people properly. In basically 20 minutes you can get a club fitting done, over and done with, get a club right there on the spot. I think that's where amateurs need to take advantage of that opportunity. I think that will help their game tremendously.

Kelly Tilghman: Talk generally about the industry and whether there's a lot of confusion out there amongst consumers about all the new equipment flooding into the market each year?

Tiger Woods: Yeah, ya think? Guys like Callaway and Taylor Made, they flood it all the time. It's very interesting to see when I play with prime guys and they tell me what is out there, what is hot, what is next, what is coming up.

I say, "Well, the driver you had a couple of months ago and right now is now ancient. There have been advances since then."

I don't think enough information is being passed on to the consumer and then in order to get everything out, they just flood it and try and get the numbers up, but that's the business side of it obviously. But from a consumer side from the guys who play golf, I don't think enough information is being passed on to them about the advances of technology and how it can help them. A lot of these companies are just trying, obviously, to sell clubs and that's it, and get their numbers. Yeah, that's great and everything but I don't see them actually helping players out the way they are supposed to be. I think if they can get the word out better and more efficiently to the consumer, what is going on? How can this club actually help you? Instead of saying, this is the new technology. Okay, go hit it. That is my opinion.

Since these interview comments from Tiger Woods are in the public domain, we at TWGT believe that every clubmaker needs to keep a copy of Tiger's comments in their shop. Such opinions from the best player in the world should be a benefit to any clubmaker who has had a difficult time convincing any golfer of the benefits of custom fitting or the value of custom fitting compared to the big brand name clubs bought standard off the rack.

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Calibration Clubheads Available for Accurate Loft and Lie Bending

This summer, successive editions of the TWGT E-TECHreport featured a series of articles about accurate measurement of ironheads during the loft and lie bending process. The majority of loft and lie bending machines today are designed to incorporate measurement of the loft and lie of the iron/wedge head from the angle of the shaft/hosel while the head is secured in the clamping fixture of the machine. Because of differences in blade length and offset from iron to iron, not to mention inconsistency in clamping the heads, it is very difficult to know if the loft and lie machine is accurately representing the loft and lie measurement of any iron or wedge head.

One way to overcome this doubt of measurement accuracy is to have a calibration ironhead for which you know the exact loft and lie. With such a perfectly measured ironhead, it is then possible to clamp the calibration head into the bending machine to be able to compare the machine's loft and lie measurements to the precise loft and lie measurement of the calibration head.

Another reason to have a perfectly measured calibration clubhead is for clubmakers who own a clubhead specification measurement machine. Because some of the set up of a clubhead in one of these measurement gauges involves judgment as to whether the head is fixtured properly for lie measurement, there can also be a modicum of doubt from the clubmaker as to whether the head is positioned properly in the gauge for accurate measurement.



Thanks to a slight overstock in one of our discontinued iron models, this month TWGT is pleased to “kill two birds with one stone” by offering the remaining Stratus 5-iron heads as calibration heads for clubmakers to use to verify the measurement accuracy of their loft and lie bending machines or clubhead specifications measurement gauges. We have painstakingly measured the loft and lie of each of these remaining Stratus ironheads to perfect accuracy using our design experience with our production grade specs measuring machinery to a tolerance of +/- 0.

While supplies last, you can order these perfectly measured Stratus 5-iron heads for only \$6.00 per head or we'll include it with an order for free to have in your shop as a calibration head to ensure the accuracy of your bending machine or clubhead specs gauge measurements in your shop.

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