



CLUBMATE **GOLF** AUSTRALIA  
GOLF CLUB COMPONENTS



**Welcome to the April issue of Tom Wishon's eTech Report!**

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### **Fitting Outside the Traditional Box - the Concept of True Length Technology™ from Clubmaker Dan Connelly**

TWGT Note: One of the most difficult things for all of us to do is to consider deviating from various accepted and "traditional" norms that have been a part of clubmaking for a very long time. For example, when TWGT introduced Clubmakers to the concept of MOI Matching golf clubs as a replacement for swingweight matching, the new concept was bucking over 80 years of the golf industry relying only on swingweight as the method of trying to make all clubs in a set offer the same swing feel. While many Clubmakers learned and now embrace MOI Matching as the best way to truly create the same swing feel for each club in the set, tons more are hesitant to even afraid to try MOI matching for fear of deviating from 80+ years of clubmaking tradition.

I first became aware of clubmaker Dan Connelly and his TL system for length fitting through TWGT's Rob Sines. At the 2007 PCS Show, I had the opportunity to sit down and listen to Dan's concept which flies in the face of literally decades of the golf industry's traditional practice of changing the length of clubs by full inch or half-inch increments. After hearing Dan's explanations for his True Length Technology™ length fitting methodology, I had to admit his work definitely has merit and should be considered by all Clubmakers. As a result, I asked Dan to write an article about his TL system so we could expose Clubmakers to a brand new length fitting methodology that is most definitely worth all clubmakers' consideration.

We welcome your comments after you read Dan's article, whether directly to Dan, TWGT or on our Clubmaker Forum, accessible through our [wishongolf.com](http://wishongolf.com) web site.

Tom Wishon

"Have you ever encountered golfers who are troubled by the condition of 'My long irons are too long and my short irons are too short'? Every set of clubs I've owned in my 35 years of playing this game have fallen into that scenario.

True Length Technology™ addresses this condition through CAD modeling the entire set by correlating the 'lengths and lies' to the golfer in their athletic address position. Imagine having one single, stable athletic address position for every club in the bag. Holding every club in the same hand position and still utilize varying lengths and lies that fit your math model, perfectly.

I have a strong mathematical background, with precision accuracy (micro-measurements) being my primary function since 1988.

- Currently a Precision Inspector (Metrologist) for the General Motors Canadian Regional Engineering Centre as a CAD programmer for the Coordinate Metrology Lab
- Past Chairman (2 years) of the 'Association for Coordinate Metrology Canada' - devoted to educating & understanding micro measurement technology
- Durham College Graduate - Mechanical Technology Program
- Certified by the Ralph Maltby's Clubmaking Academy in:
  - Assembly and Repair
  - Professional Clubfitting
  - Masters Program (only 3 in Canada)
- Certified Rifle Shaft Fitting Centre
- Accredited by the Golf Clubmakers Association (GCA) with Professional/Advanced Status
- Developer and Owner of the Proprietary Length/Lie/Fitting System - True Length Technology™
- Currently pursuing accreditation with the Professional Clubmakers Society

## Current Trends

When I reviewed the standard lie angles versus length throughout the golf equipment industry, the lie angle progressions did not add up mathematically to the traditional standard lengths of the various golf club companies.

Company A - Lie angles increment in ½ degree per club,

Company B - Lie angles increment in 1 degree per club,

Company C - Lie angles vary and don't seem to follow a progressive pattern.

How could each of these (different) lie angle designs all have (identical) finished lengths? OR conversely, how could each of these lengths all be matched to a little different lie angle spec and progression?

## Address Position

During any lesson, I was always taught to 'get into my athletic address position'

- Feet shoulder width apart
- Knees slightly bent
- Spine tilted forward near 30 degrees
- Arms hanging down and slightly out from your body

When I did this my 7 iron fit and played like it was built for me

- Slight amount of grip cap extending out from and a little above my upper hand
- Lie angle looking correct at address
- Hit the ball straight

However, when I assumed the same exact stance position and posture, my 3 iron would have nearly one inch of butt cap extending out from and above my wrist at address, while my pitching wedge would almost be down into the palm of my hand. It seemed that there was roughly an extra 1 ½ inches between my longest and shortest clubs that just did not seem to fit my position. Most golfers who use a traditional set of clubs must adjust their spine tilt, knee bend, distance between their feet, etc. for every different club in their bag. This will result in the golfer having to recall and execute 13 slightly different setup positions to maintain one common hand position. No matter how good of an athlete you are, this is a very difficult task to master consistently.

I felt that if I was a visually handicapped golfer, I would setup in my single, repeatable athletic position consistently - waiting for my club to marry with the same exact stance and posture. Would I know the position I was suppose to be in if I was holding my 3 iron verses my pitching wedge? Would there be a difference? My thoughts were 'No, I am ready to hit, give me my club please.'

In trying to understand how these theories worked with my existing clubs, I began to think, that just maybe, there was a more scientific approach to length relative to my athletic address position.

### **The Birth of - True Length Technology™**

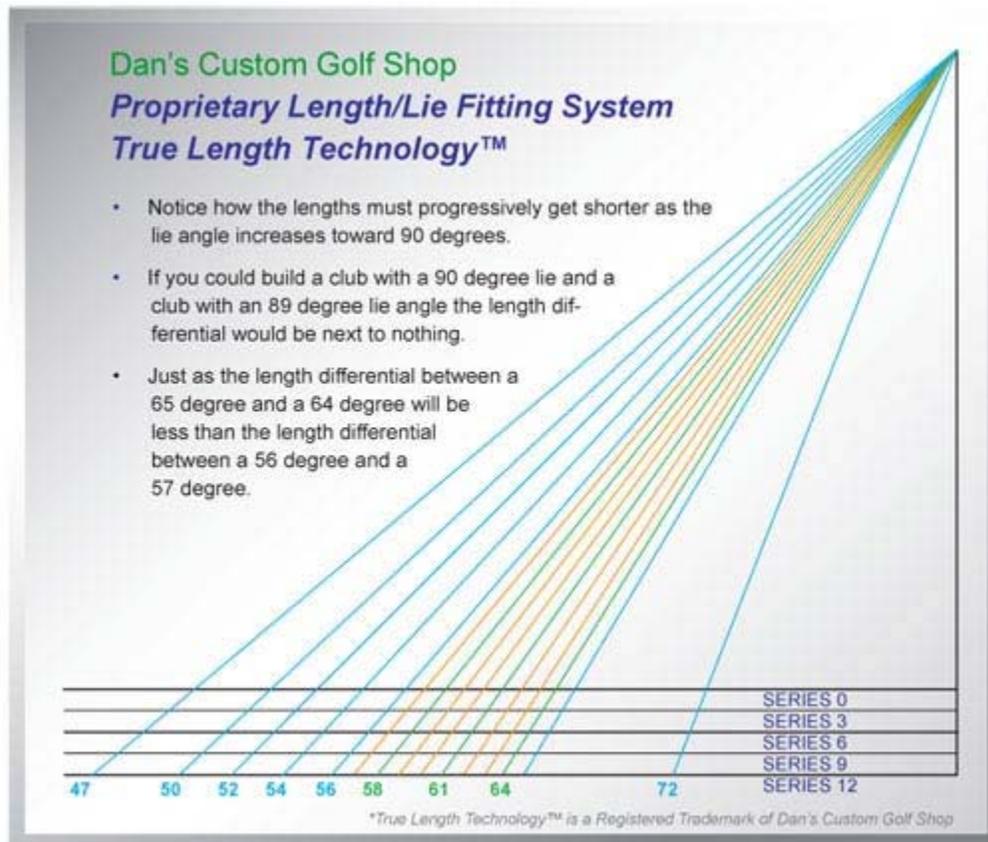
My first attempts at alternative lengths were building in 0.4 inch, 0.33 inch and 0.25 inch increments, which did help, but this too did not fit perfectly. After many different attempts, I decided to try 'Math Modeling' a set based on my athletic address position. As I began plotting lie angles on my computer, it became apparent rather quickly that any uniform increment length cut (not just ½ inch) was not mathematically correct. True Length Technology™ proves that the length cut has to be progressively less per club as your clubs get shorter in length and more upright in their lie angles.

### **Representation**

If you picture a set of triangles and compare

- one at 56 and one at 57 degrees
- one at 64 and one at 65 degrees,

The length differential between the 56 & 57 degree angles are greater than the length differential between the 64 & 65 degree angles. Herein lays the proof that any static number like ½ inch or ¼ inch variation per club is not mathematically sound. Each increment has to be progressively less than the last increment as the clubs get shorter.



True Length Technology™ clubs do vary in length. However, their club to club length increment of change is less than the traditional ½ inch increment. In fact the length variance is perfect from club to club, giving the golfer an identical and more easily repeatable address position and posture for your personal setup.

As all custom clubfitters know, one size does not fit all. More precisely, only one size fits each different golfer individually. As all custom Clubmakers know, length and lie are vitally important fitting specifications, but clubmakers only have access to a few charts that are 'recommended build sizes' - 2 charts for men, 1 chart for women.

If you look at any of the old 'Clubfitters Rulers', one single 'recommended club length' fit is ordained to fit over 3½ inches of variations in the Wrist to Floor (WTF) measurement, except for women, in which case the clubs are always assumed to be 1 inch shorter. How much sense does that make? Someone with a 34 WTF is playing the same lengths as someone with a 37 WTF? This again is not mathematically sound and is simply done on such length fitting rulers for convenience.

### **True Length Technology™**

The True Length Technology™ system consists of a series charts that vary from what I call a Series 0 to a Series 12 golfer. Every chart is a Math Model of perfect proportions for each individual series. The math behind the True Length Technology™ assembly charts is the result of each golfer's single most comfortable address position. Not everyone addresses the ball in the same manner and therefore the target assembly charts are still susceptible to some variation. You, as a clubfitter need to find the correct series target length for each individual golfer and then build the clubs to the appropriate Series chart.

Note; WTF measurements are used but only as a starting point within the fitting process. A full dynamic fitting is still recommended using the True Length Technology™ Fitting System.

- Hitting balls allows the fitter to be aware of swing tendencies and club head paths that do influence ball flight.
- Individual swing skills certainly do play an active role in determining the correct final lengths.
- Dynamic fitting is still a necessary step due to different bend profiles of shafts, and the dynamics of the individual's swing. The math model would remain intact if all lies within the set were altered to the same degree, resulting in an averaging out of today's swing flaws.
- The traditional dynamic lie board adjustment should be used for every club as a more accurate lie fitting alternative to the averaging method described above.
- The golfer who sets up with a traditional stance will often find that the WTF measurement will often correlate to the Initial Target Series Chart and will indeed be very close to the final build specification.
- "Single axis swing" golfers and some women who carry their arms more out and away from their body will in all likelihood need a set of greater length, deviating from what their WTF target indicated. Again, True Length Technology™ is not strictly a WTF system because it is intended to correspond to the most comfortable stance and posture position of each individual golfer.
- People with disabilities, who have difficulty assuming a traditional stance and posture position may need a variation in length and lie, but will still end up in a single stance and posture position - common to every club and the key to more repeatable swing consistency.
- All of the above scenarios need to be addressed by the fitter in determining what the proper 'actual' assembly size will be. Once the Target Series Build Chart has been determined, the builder needs to build to the specifics of that Target Series chart keeping the math model intact.

## Fitting System

In my most formal development, I have created a TLT System Set which I use to fit golfers and implement my TLT fitting technology. The full True Length Technology™ Fitting System consists of the following:

- A '5 piece set' for every Series Chart.

Each True Length Technology™ Fitting System Set consists of;

- 4 iron at 58 degrees of lie
- 7 iron at 61 degrees of lie
- PW at 64 degrees of lie
- Driver is built to a 47 degree static lie/length chart due to the shaft bend properties.
- Putter lengths are listed for 3 different positions - Upright, Mid and Low due to the many varieties of styles. Putters must be fit to the individual; therefore each Series Charted Listings are for reference only.

Note: Having a '5 piece fitting set' per each Series is not essential, but can be helpful as this becomes the selling feature when the individual gets to actually hold, feel, and swing each club in the set. Alternatively, TLT fitting with the Series charts followed by building actual test/demo clubs that will become a part of the golfer's final TLT set may be much more convenient for Clubmakers.

Each True Length Technology™ fitting set has its lengths correlated™ with its lies - set to a perfect math model for all Series Build Charts. However, TLT does recognize that dynamic lie fitting of the TLT length fit set is a proper way to accommodate all lie fitting requirements within the TLT length fitting.

Traditional fitting methodology still does apply, where the customer needs to go through;



With True Length Technology™, when I step up to a wedge, 8 iron, 5 iron, or 3 iron, I get myself into my perfect posture first, and my hands are in just the right spot now without having to manipulate that club in my hands or alter my posture for the iron I'm holding.

I have control and spin with my wedges, I have the ability to work the ball as I like with my long irons. I no longer have to factor in that 15 yard draw that I know my 3 iron used to produce. I can fade or draw the ball as I need to, with the rest of my shots going straight, using my comfortable swing.

To me, True Length Technology has not only improved my game, it has improved my teaching ability, and the learning curve of my students.

They can perfect that 7 iron posture and fundamentals, and easily transfer it to any club in their bag.

If you have any questions please do not hesitate to contact me at any time. Next thing we're working on is the putter!

Kind regards,  
Nadine Foreman  
CPGA Class "A" Professional

Ms. Foreman is not paid to use my system, and in fact bought her custom fit set because of True Length Technology™. Her statement reflects that of pretty much my entire customer base. Once you have tried True Length Technology™ I'm confident you will become a believer as well.

## **FAQ**

Q. Does the shorter length separation affect the shot distance separation between clubs?

A. No, in fact many report back that they have actually increased distance due to more on center hits.

Q. How will the Swingweight of the clubs in the set be affected?

A. A longer overall length set of clubs (Series 10) often will of course have to be built with the lightest head weights possible to help maintain a manageable feel and swingweight or MOI for the set. A shorter overall set of clubs (Series 2) will typically need to be built with heavier head weights to help maintain playable characteristics, feel and swingweight/MOI. A mid length set (Series 6) can be built to a single swingweight or on a progressive swingweight slope (very similar to a Moment of Inertia matched set).

Q. What happens if I need a very upright (or flat) set due to my swing (and I don't want to change it)?

A. The entire set will need to be upright (or flattened) from the initial starting TLT standard, using a dynamic lie fitting procedure to determine the final lie angle for each club in the golfer's set.

Q. Do wedges follow the same length / lie technique?

A. This depends on your type of wedge play. I keep the length of my Gap, Sand & Lob at the same length, and this means that their lies will usually be identical once the final dynamic lie fitting is done. However, if you are only using half shots with some wedges than special attention may need to be taken to tune the lie as head flattening can be to a lesser degree.

Q. Why are Drivers and Fairway woods built to a much flatter degree than what the actual head specification is?

A. Wood shafts are thinner in the tip area and are prone to different bend properties. As the club is swung the Center of Gravity of the larger head is trying to get in line with the shaft axis at the hands. The size of the head and the location of the COG cause a higher degree of head flattening during the swing. Research has shown that woods built to their corresponding WTF charts have proven to be the most effective.

### **True Length Technology™**

One common hand position, relative to a perfectly math modeled length and lie will result in:

- A very repeatable athletic address position
- A very repeatable swing pattern
- More on center hits
- Fewer fat shots
- Fewer thin shots
- Improved feel and playability
- Less physical stress on the body
- Final result - Improved scoring.

Dan Connelly's 'True Length Technology™ Fitting Charts' (All 12 Series Charts + Build Procedures in 'Word' Format) suitable for printing the actual Clubmaking worksheets, can be purchased for a limited time only.

Introductory Price of \$159 Canadian Funds - Tax Included. Check, Visa or Master Card. You may contact Dan or Marianne at 905-263-8510 or E-mail - danscustomgolfshop@hotmail.com. If you are interested in contacting Dan to purchase the TLT Fitting Charts, please include your name, the name of your clubmaking business, address, telephone number and email address. As a Registered TLT Clubmaker your business name and point of contact information will be listed in Dan Connelly's Clubmakers Registry at [www.truelengthtechnology.com](http://www.truelengthtechnology.com)

### **How Should Demo Clubs be Used in Custom Clubfitting?**

I'm going to be up front and frank about this subject because it is an important part of any custom fitting business. All Clubmakers who wish to develop an ongoing business in custom clubfitting need to have samples of the different models of clubheads, shafts and grips they will offer to golfers in their work. However, the custom fitting process should never be a case of "trial and error" hitting of demo clubs until you find one the golfer likes or hits better than his/her previous clubs. That's how standard clubs bought off the rack are sold. It is NOT how custom fitting should be done because it would quite literally be impossible for a clubmaker to have all the possible combinations of clubhead, shaft and grip models plus assembled to all of the different specifications for a golfer to hit.

Let me put it another way. Let's say you have 4 different driver models you feature in your shop, each which is available to you in three different lofts and two different face angles. Right there, you have 24 different driver heads. Let's say you then have five different models of shafts, each one available in three flexes. That's 15 different shafts. When you multiply the shaft options times the 24 different driver heads you could offer to your golfers, you end up with a total of 360 different demo drivers!

When you think about demos in your custom fitting business, focus on the fact that the main purpose of having samples in your shop is not for a "hit until they find the one they like" approach, but rather

is for the golfer to “touch, handle and see” the various models you will recommend as candidates for their fully custom fit clubs. Our TWGT staff is very good at being able to determine which of our clubhead and shaft designs will be best for the market of golfers you serve, and do so without ever “overloading you” with too many sample models.

Custom fitting is never intended to be a “trial and error” process. If you read Chapter 2 of our Common Sense Clubfitting book, you will have a good description and reference for how we advise the actual fitting process to be conducted to result in the best overall recommendation of clubhead, shaft, and grip models along with the custom specifications for a golfer. To rely on having the golfer hit actual test clubs looking for “the one that is right” is not how custom fitting should be done.

At the same time, we also realize golfers would like to be able to hit the clubhead or shaft model you will eventually recommend. After all, they’re probably used to having tried out the off the rack club(s) they bought for their current set, because that’s how the brand name club retailers like to sell the standard made brand name clubs.



I think the best way to handle the situation can be summed up as follows based on how we conduct a fitting session at our R&D facility:

1. If possible, have the golfer bring their current set to the fitting appointment. While the golfer is filling out the fitting information form that we use to learn as much as we can about their current manner of play, we perform a number of key measurements of their clubs. On Driver/Fairway woods we measure the length, loft, face angle, lie angle, MOI or swingweight, total weight, and butt frequency. For irons (usually a 5 and 7 iron), we take the same measurements as above except for the face angle. For wedges, we add in the sole/bounce angle. For putters, we measure length, loft, lie and MOI/SW. With this information we are able to better understand the shot tendencies that the golfer will supply in the fitting form and determine if what we are seeing for ball flight is an equipment issue, a swing issue or some combination of both.
2. Have the golfer warm up to get ready for shot analysis using their current clubs. After all, they are more familiar with their current clubs so this will allow them to be a little more relaxed in what can be a pressure situation of having to hit shots in front of you, the expert in clubmaking. This also allows you to see if some of the information they indicated on the fitting information form is right or exaggerated, and also allows you to determine if some of the specs you measured on their current clubs is a probable cause of any/all of the shotmaking improvement areas they provided in the fitting form. While they are working their way up through the bag getting warmed up, read the information they provided on the fitting form so you become aware of their fitting goals, shotmaking tendencies and problem areas.
3. Once the golfer is warmed up, record or note the key launch parameters of the mid-iron and driver/3-wood swing speed, swing path, swing plane, downswing transition/tempo/release, and launch angle/spin/ball speed/angle of attack if you are working with a launch monitor. Because you do not want to tire the golfer by having them hit too many shots, give them a rest during their ball hitting to record the wrist-to-floor and hand measurements you’ll need as the starting point for their length and grip size recommendations

4. If you have a strong, working knowledge of clubfitting such that you can mentally start formulating the fitting recommendations they'll do best with, start making notes for any of these new club specifications you feel they need to improve while they are still hitting a few more shots. If you can't yet "do the math in your head" to come up with the fitting specifications "on the fly," leave this for later when you can sit down uninterrupted with all of their information and measurements to think out each area of the fitting.
5. Once you have all the data, information and measurements you need, begin to show the golfer the clubhead model(s) you think may be the best for their individual fitting needs. As you show them the head models, explain the models' design characteristics and why you believe these heads are best for the golfer. I do think it is wise to have your few demo heads built with a "vanilla R-flex" shaft. This way if the golfer wants to hit a sample of the head model you are recommending, the shaft may be too flexible but it won't be much too stiff either, which is much worse for the golfer. As you give the golfer the club to hit, I approach it this way. . . .

"Mr. Jones, if you'd like to hit a few shots with this model, by all means don't hesitate to do so. Just understand that this is not the shaft I will be recommending with this head design. Once you decide which model makes the most game improvement sense and looks good to you from what I recommend, my next step will be to build you a test club which will possess all of the custom fitting specifications I will recommend for you and your swing. When your test club is ready, I'll ask you to come back and hit shots with the club while I make some more observations and get your feedback. From that we'll know the final specifications for your custom clubs so I can build your full set and you'll be all set to head out and have more fun playing to the best of your ability.

For those of you comfortable with properly using a shaft to head connection device such as the Club Connex or similar, it's fine to use these to help the golfer get a little better feel for the shaft model you have in mind for them. From my experience, much more skilled golfers are a better candidate for taking more time in the shaft fitting side because these golfers rely so much more on the feel of the shaft to be happy with their custom fit clubs than do golfers of average to less skilled ball striking ability.

At the end of the day, Clubmakers do need some demos in their shop. But use them more for show and tell or a "I'd like to get your feedback for this" rather than as a "hit until you find the one you like." Finding the right specifications for every golfer is far more a matter of learning and using the knowledge of Common Sense Clubfitting to process the golfer's inputs and measurements into a custom fit set that delivers real game improvement.

Our staff will never ever suggest demo heads or shafts that you can't or won't need, so call us for help in this area and we'll be glad to assist.

### **It May Not Have Worked for Phil in Augusta, But We Still Think Two Drivers to be a Good Idea for Some Golfers**

Clubmakers and Golfers who follow the equipment trends and experiments on the PGA Tour are aware that Phil Mickelson again chose to play with two different drivers in the recent Masters tournament. A concept he first tried at the US Open last summer, Phil went with the two driver set up for Augusta in an effort to have one long distance driver for the longer or more open par-4 and par-5 holes, and one for more control on the shorter and tighter holes.

While Mickelson's 2007 Masters performance certainly indicated the two driver set up did not make much of a difference, once again TWGT wants to stress to Clubmakers that the idea of "one driver for

all out distance and one driver for control” makes a lot of sense for certain golfers and for certain golf courses. However, before trying to sell every golfer on this concept, it is vital to understand which golfers may benefit and which will not.

First and foremost, for a golfer to make use of different drivers for more distance vs control, the golfer must have the swing skills to be able to achieve a higher swing speed with a driver of longer length. Keep in mind that most golfers will not experience any increase in driver swing speed when using a driver of longer length. For a golfer to achieve a higher swing speed from a longer length, the golfer’s swing must include a later release of the wrist-cock angle and a square to inside/out swing path. Golfers who unhinge the wrist-cock angle early to midway on the downswing and/or have an outside/in swing path will not experience any increase in swing speed from a longer playing length, which thus means they would not gain any advantage from having two different performing drivers.

However, for those golfers who do possess a later release and a square to inside/out swing path, fitting them with two different drivers does not typically mean they are to carry them both at the same time. The wisdom of fitting such golfers with two different drivers lies in the fact the golfer has an alternative driver to use when playing a course that is longer and more wide open vs playing a course that puts a far greater demand on accuracy off the tee.

In building the driver for most distance when accuracy is not in that high of demand, a length of 45” to 46” would be customary, with the loft and face angle both fit to meet the golfer’s swing speed, angle of attack and misdirection tendencies. When building the driver for control, the length should be in the area of 43-43.5” with face angle again chosen to address their common misdirection tendency. For the control driver’s loft, it is not “set in stone” to choose a higher loft than is fit for the longer distance driver. Yes, more loft will reduce the tendency of the shorter length driver to roll into trouble because of its greater angle of descent to the ground. On the other hand, if the shorter length plus the proper face angle delivers much better accuracy, there is no reason the shorter length control driver should not be built with the same loft as the long distance driver. However, if the golfer still has a tendency to hit a shorter driver somewhat off line, increasing the loft of the control driver can help ensure a higher percentage of tee shots in play.

### The Ultimate “Thriver” is Coming from TWGT!

Contract the terms “Three-Wood” and “Driver” together and you have one of the latest new trends to appear in golf equipment – a wood head with an 0.830 COR and strong off center hit performance, designed primarily for use off the tee on very tight, demanding tee shot holes where distance is still an important requirement.



Coming in May from TWGT will be a new and very unique addition to the model 525 design family . . . The new 525F/D “Thriver”.

Designed with a 40mm face height, 200cc head volume and 13\* loft, a high performance variable thickness face technology and manufactured to a 3-wood headweight, the new TWGT 525F/D is a true fairway driver that will stand as the ideal woodhead for any demanding tee shot that requires both distance and accuracy.



## CX Micro Wedge Design Line Expanded

To say the new CX Micro wedge designs have taken the custom clubfitting market by storm so far this season is a little bit of an understatement. TWGT's unique combination of CNC Milled Face with the new micro-groove scoreline design has already proven its spin performance improvement to literally thousands and thousands of Clubmakers and golfers since their introduction in January.

(That's a more "official" way of saying if you haven't exposed your golfers to the CX-Micro wedges' instant performance improvement, you're really missing a huge opportunity to increase your custom fitting sales and prove to any and all "doubting Thomases" that the clubs you fit and build are definitely of the best quality in the entire golf business!!)

In response to requests and suggestions, TWGT is pleased to add a brand new CX Micro 58 degree loft/8 degree bounce sole angle design in RH in both platinum nickel and satin chrome finishes. The 58 degree loft is ideal for players who wish to have both sand and lob functions in the same wedge, and the 8 degree bounce sole angle is well suited for any shot from the rough or fairway as well as for use in sand by golfers who do not have a real steep downward angle of attack.



CX Micro 58 - Satin Chrome



CX Micro 58 - Platinum

The new CX Micro 58/8 wedges are scheduled to be in stock by late April. And don't forget the other members of the CX Micro wedge family in 52, 56, and 60 degree lofts in both platinum and satin plating finishes. LH in 56 in both finishes too. TWGT is in a good stocking position with all of these CX Micro designs so you can continue to impress your golfers with the quality designs you can custom fit and build.

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