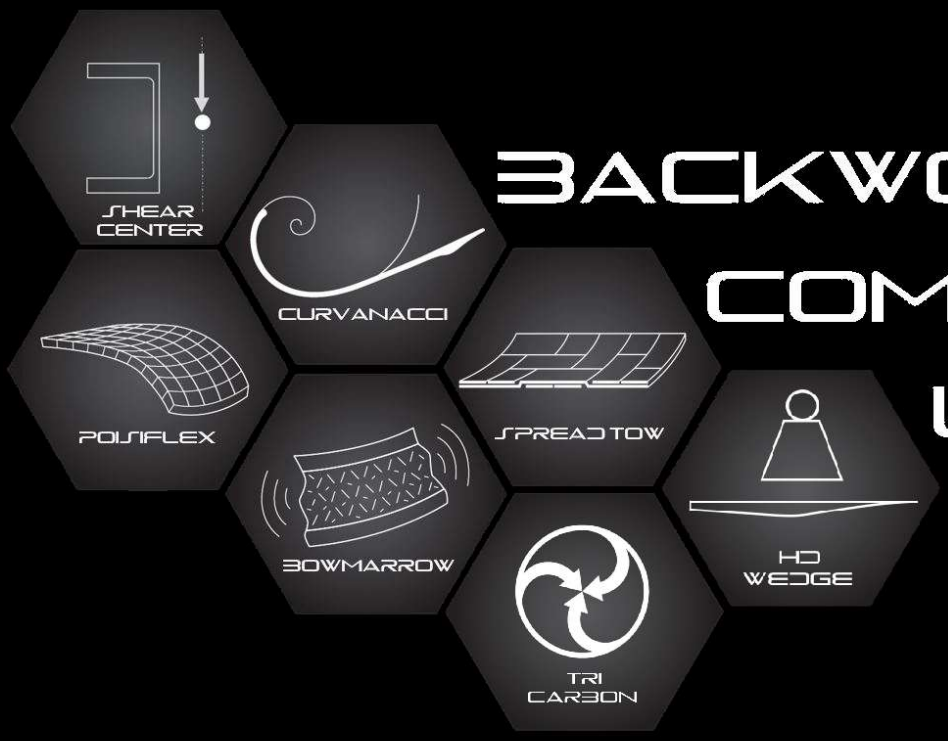

BACKWOODS COMPOSITES LLC

BOW SYSTEM GUIDE 2026 V3.03

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1 INTRODUCTION

1.1 Introduction to Guide

Thank you for choosing Backwoods Composites LLC for your next level archery experience. We strive in making the most advanced Traditional bows available in the market. We are the future of Traditional Archery and you can be too!

Our limbs and risers are not the same as every other bowyers, so please read through the guide.

While reading this guide please pay attention to the following:

- A ***bold/italic*** word will be defined in the appendix at the end of this document
- Any **bolded/*italic*** statement ending with **"!!!"** is very important and may not be normal to most bows you are used to, which is why we want you to know it is important.

1.2 Safety

- **WARNING A BOW AND ARROW IS NOT A TOY!** This is a tool and capable of **serious injuries of animals and PEOPLE** and in some cases death. Please exercises caution when using your bow. The following safety recommendations should always be followed and you the owner resumes full responsibility to any property damage, personal and bystander injuries.
  - Always use a bow stringer to string your bow.
  - Always use a bow stringer to string your bow. To achieve the longest life of a bow and or bow limbs please use our supplied stringer with every complete bow and bow limb set we sell.
  - Never point bow at people
  - An adult should always supervise minors when they are handling or shooting a bow.
  - Always where proper protective equipment when shooting bow; finger tab and arm guard.
  - Never shoot at rocks or hard objects arrow may ricochet and hit something you were not intended on shooting
  - Arrows shoot from bow at an angle at 45 degrees can cast an arrow 200 yards or more. Long range shooting should only be done in a large flat field without any visual obstructions
  - Always inspect every arrow for damage before shooting. Wood or composite arrows can hide their damage within, we recommend you do a static bend test on all arrows that could have possible damage
  - Anybody past 90 degrees to the left and right in front of you is considered in the "line of fire"
  - If you are new to archer we recommend you go to your local archer shop or range and get instructions
  - Always use proper bow string material. If your bow string is damaged do not shoot the bow, replace string before shooting again
  - Never dry fire the bow
  - Be careful of friends and family members drawing your bow back. They may or may not have read this manual. From our experience, we see a lot of unexperienced and unknowledgeable over draw and dry fire bows.
  - If a dry fire does occur do not panic, just inspect the bow for damage and take caution on your next few shoots. If you are unsure about potential damage, please contact us. Our prototype bows are tested by dry firing them many times without degradation. Failure happens when there is underlining damage to bow due to miss use or rough use in the field.
  - Never use alcohol or drugs while handling or shooting a bow
  - Never loosen limb bolts further than manufactures recommendations
  - Never shoot bow with the incorrect arrow spine or length required for the bow and archer

- Never mechanical alter or modify any part of the bow. Drilling holes, cutting, filling, or sanding are examples of mechanically altering a part of the bow. This could cause the ***bow system*** not to work properly and break which could cause death or serious injury
- Never expose your bow to extreme heat or prolonged moisture. Damage can occur to your bow from heat and moisture.
- In compliance with California State Prop 65. Our products contain chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.
- Remember you can always contact us and we will be happy to help you with any questions you have.

1.3 Warranty

- If within 1 year any damage or failure due to inferior materials and or workmanship the product will either be repaired or replaced with equal to or greater value if repair is not feasible. If damage or failure occurs after 1 year, repairs can be made at reasonable price. If repairs cannot be made and damage is within two years we will replace the bow/limbs/riser with a equal to or greater value bow/limb/riser at 2/3rd the current retail price. All warranties are voided if Backwoods Composites inspector deems misuse. Please note all repairs run the risk the area of repair being cosmetically unpleasing but we will insure you that the repair is structurally sound. Warranty only applies to the original owner.

2 LIMB AND RISER SELECTION GUIDE

2.1 Limb Types

- Each of our three limbs are designed for their own specific purpose. Wither you're a hunter or a high-level target archer we have a limb for you. The reason for this is if one limb was to be designed trying to maximize every design parameter the design would be average across each parameter. This would result in an average limb. All our limb designs are the best we have in materials, construction and quality. We do not sell economy limbs. The following Figure is a bar graph showing each of the design parameters and how each of our limbs measure up against each other.

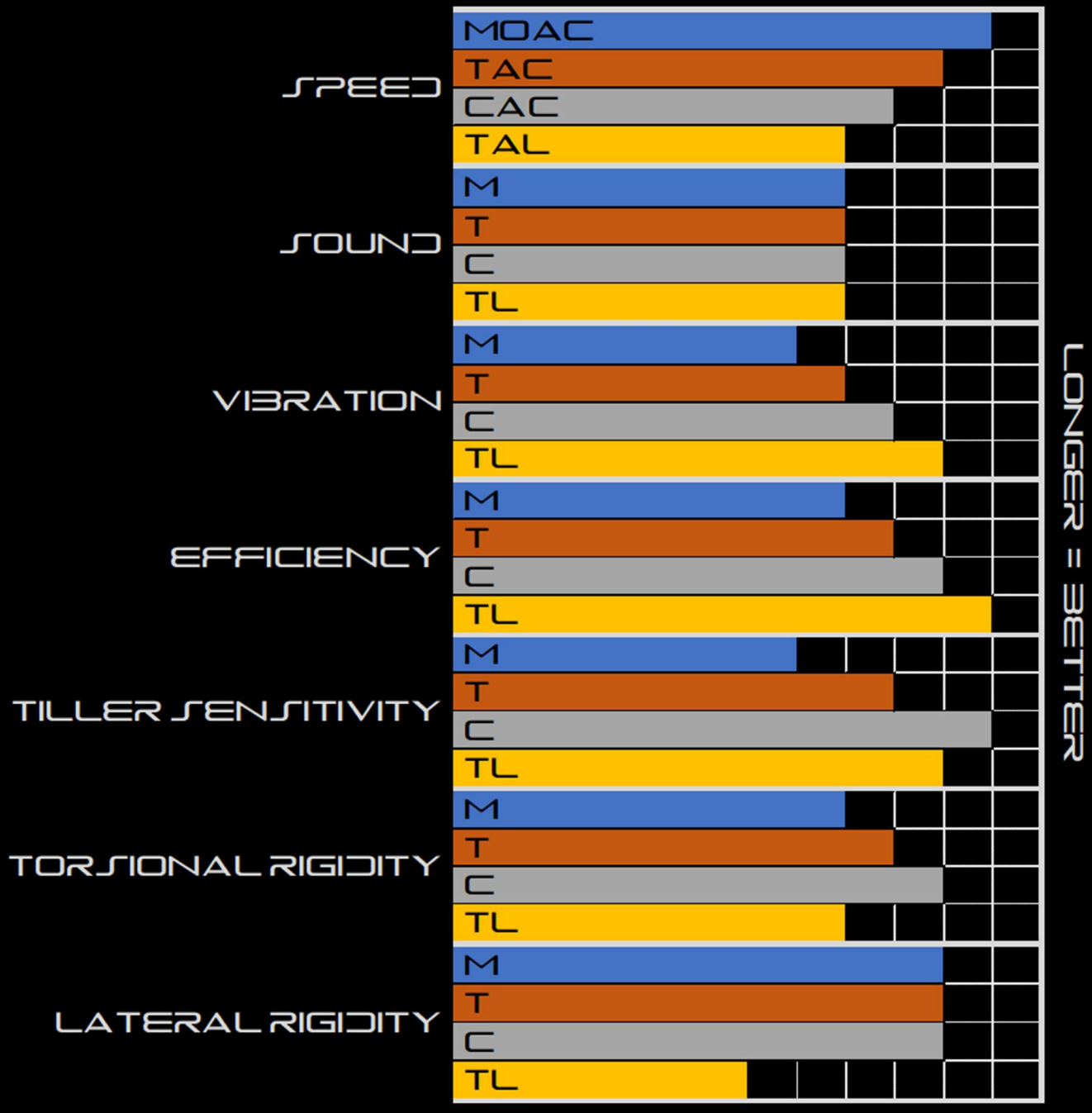

Figure 1 Design Parameter Bar Graph

- To simplify the bar graph, an archer could break these into two categories, accuracy and feel. We define bow "feel" as an experience of sensation throughout the body and mind during shot execution. The following Figures is the simplified limb design parameter chart.

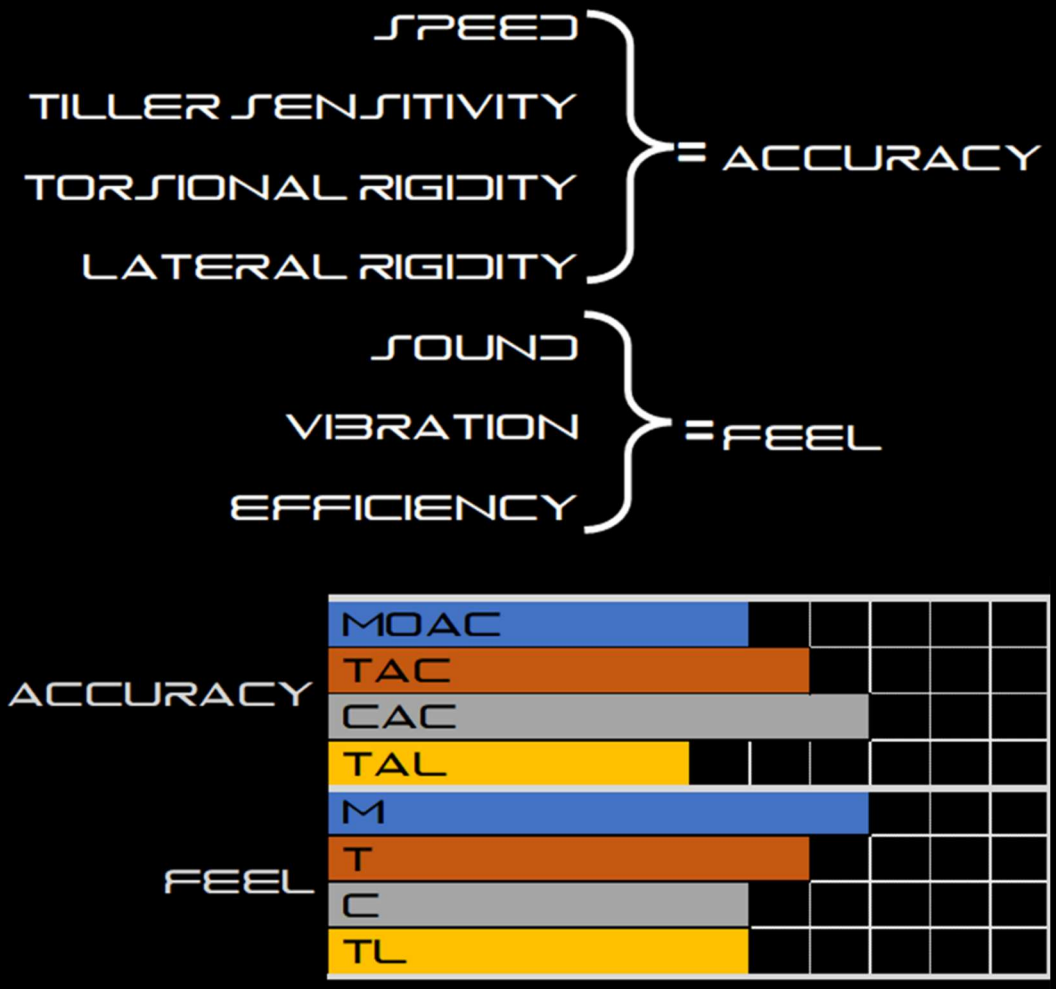

Figure 2 Design Parameter Bar Graph Simplified

- Style of shooting is the major deciding factor when choosing our limbs. We designed each type of limb to work with a different style of shooting in mind. This does not mean you have to select a limb based off our recommendations; We just feel this will give you the highest performance for your target of choice
  - MOAC limbs were designed for those who have a good foundation of consistent shooting. Meaning you have your style and you have practiced it for plenty of time to become consistent in grip pressure, finger pressure and you are well aware of how to adjust tiller for your personal way of shooting.
    - Because tiller is more sensitive for this limb design, we do not recommend MOAC limbs for those who string walk consistently up/down more than 1.5" from their set tiller location. This would be equal to a 3" total distance from the nock set.
    - Split, 3 under, fixed crawl all have a consistent draw/release location, making MOAC limbs the best choice.
  - TAC limbs were designed for string walkers and those anticipating non-consistent draw fingers or grip pressure.
    - We do not recommend string walking greater than 4" because it can have a negative effect on the life of the limbs due too high uneven limb flex between top and bottom limb when crawling far past tiller tuned location.
  - CAC limbs were designed for string walkers and high-level target competition. These are our most forgiving limbs in our line up. This limb is our conventional recurve.

- TAL limbs are our longbow limbs. They are for those who have a desire to shoot longbows and want the highest performing longbow to maximize their results in a longbow class.

❖ The material used in all our recurve limbs are identical.
- Only difference is the amount of recurve in the limbs.
  - MOAC limbs have a more aggressive hook, CAC limbs have the least and TAC limbs are in-between.

❖ Longbow limbs have slightly different carbon than the recurves. Through analysis and testing we found to maximize longbow performance the carbon had to be different.

❖ The normalized force draw curve and associated change per in curve is presenting in following Figure.
- A normalized force at 28" draw is the best and only way to accurately show a difference in bow designs. It gives the ability to see how each limb type behaves when keeping draw force equal.

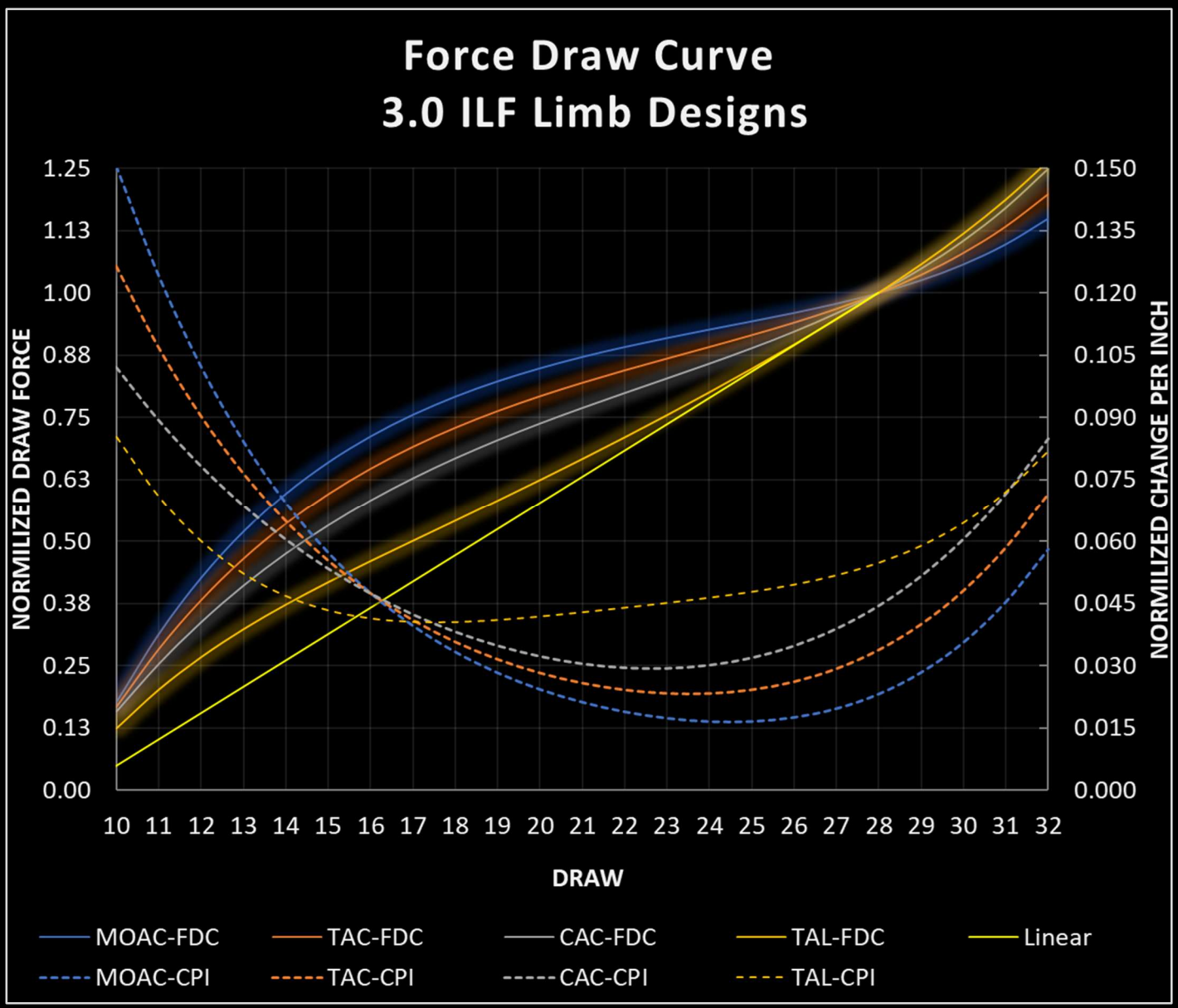

Figure 3 Force Draw Curves

- Archers' interpretation of the draw felt as shown in graph:
  - Preload Up Front
    - MOAC > TAC > CAC > TAL
  - Poundage Change per Inch at Full Draw
    - TAL > CAC > TAC > MOAC
  - Stored Energy
    - MOAC > TAC > CAC > TAL
  - Smoothness
    - MOAC = TAC = CAC = TAL
      - We define smoothness as no rapid change in the CPI. Poor smoothness can be felt in limbs that have a high level of stacking and limbs that exhibit a rapid loss in CPI which is associated with many aggressive recurve designs (perceived let-off).

❖ The following Figure shows the difference in speeds.

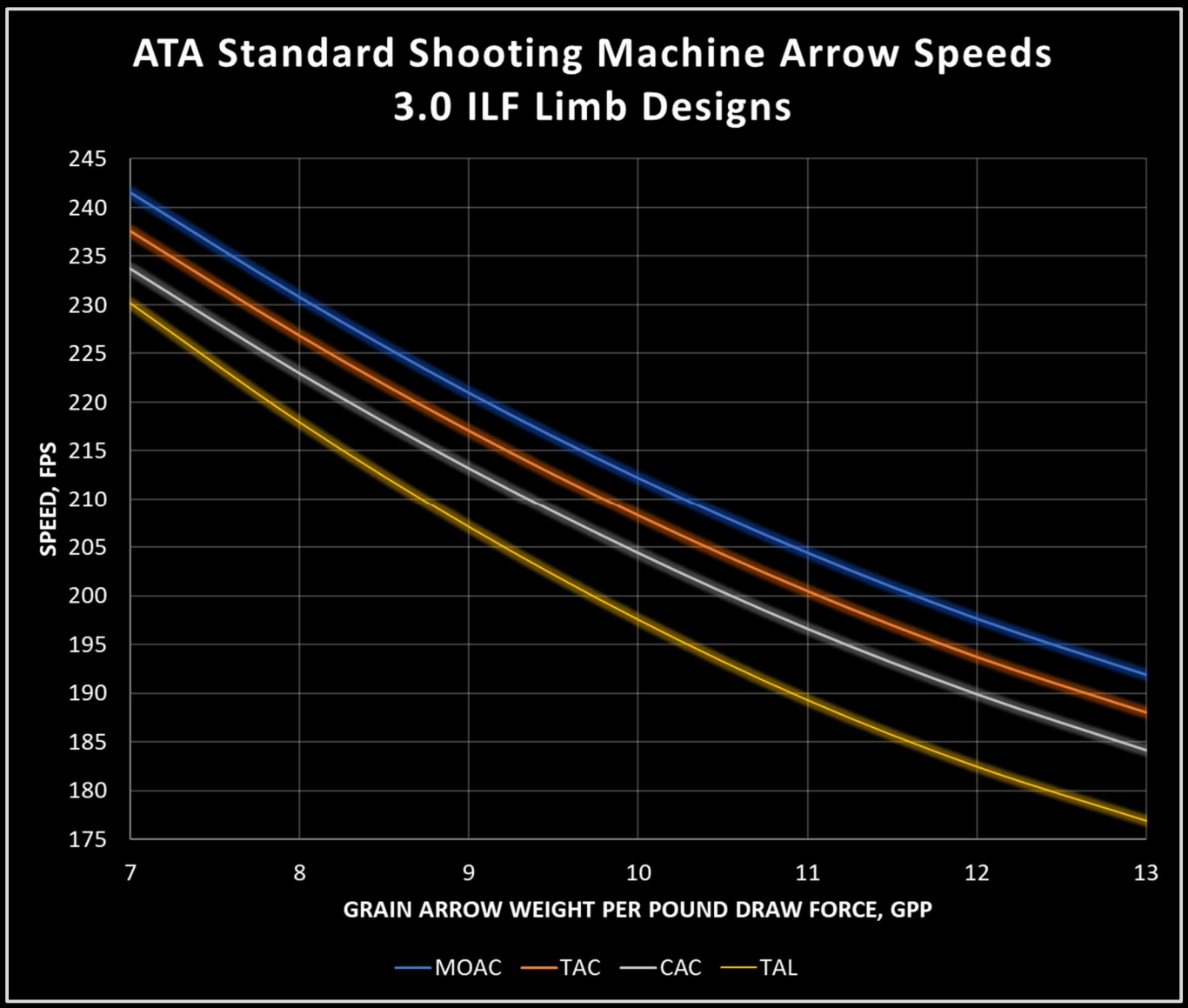

Figure 4 Arrow Speeds

- Speeds shown are measured off a shooting machine and are not what the archery will achieve using traditional methods of shooting.
- The following is a list of bow system configurations that effect speed
  - Limb Type
    - The stored energy and preload effect speed of the limbs
  - Limb Poundage
    - Higher poundage limbs are more efficient than lower poundage limbs due to the construction limitations.
  - Draw Length
    - Longer the draw the greater the amount of stored energy and therefore increase in arrow speed. This is not just a poundage at draw, this is how many more inches the archer drew back.
  - Brace Delta from Nominal
    - Higher brace decreases the amount of stored energy and therefore reduces the arrow speed.
  - Limb Length
    - Shorter limbs are inherently faster because the lighter limb mass driving up efficiency
  - Limb Angle Exiting the Riser
    - The shallower the limb angle the more preload in limbs and therefore greater speeds.
  - Riser Deflex
    - Deflex is a direct relation to draw length and therefore speed. A riser with 0.5" more deflex will equate to a loss in 0.5" of draw and therefore reduce speed.
  - String Type and Quality
    - Quality and material being equal, endless loop is slightly faster than flemish string.
    - Too many twist can lower speed
    - Heavier string will reduce speed
  - Limb Dampening
    - Addition of limb dampeners decreases the arrow speed
  - String Silencers
    - Additional weight to string or limb string grooves to silence string decreases the arrow speed.
  - Release Style
    - Finger release loss in speed 5-10fps per advertised
    - Thumb release loss in speed 3-7fps per advertised
    - Tigger release zero loss in speed

- Our limb and riser combination charts are designed for determining peak performance for speed and ensure safe use
  - To use our limb and riser combination chart first choose what limb you want to use and know your AMO/ATA Actual Draw Length (Archery Trade Association).
    - By ATA standards draw length is "The distance from the bowstring at the nocking point location, while at the bow's full-draw condition, measured to a vertical line through the pivot point of the bow grip, plus 1 ¾ inches ($\pm^{1}/_{16}$, -0 inches) the belly side throat of the grip to the string and then add 1.75"." (Ref. 1). This is shown in the following Figure.

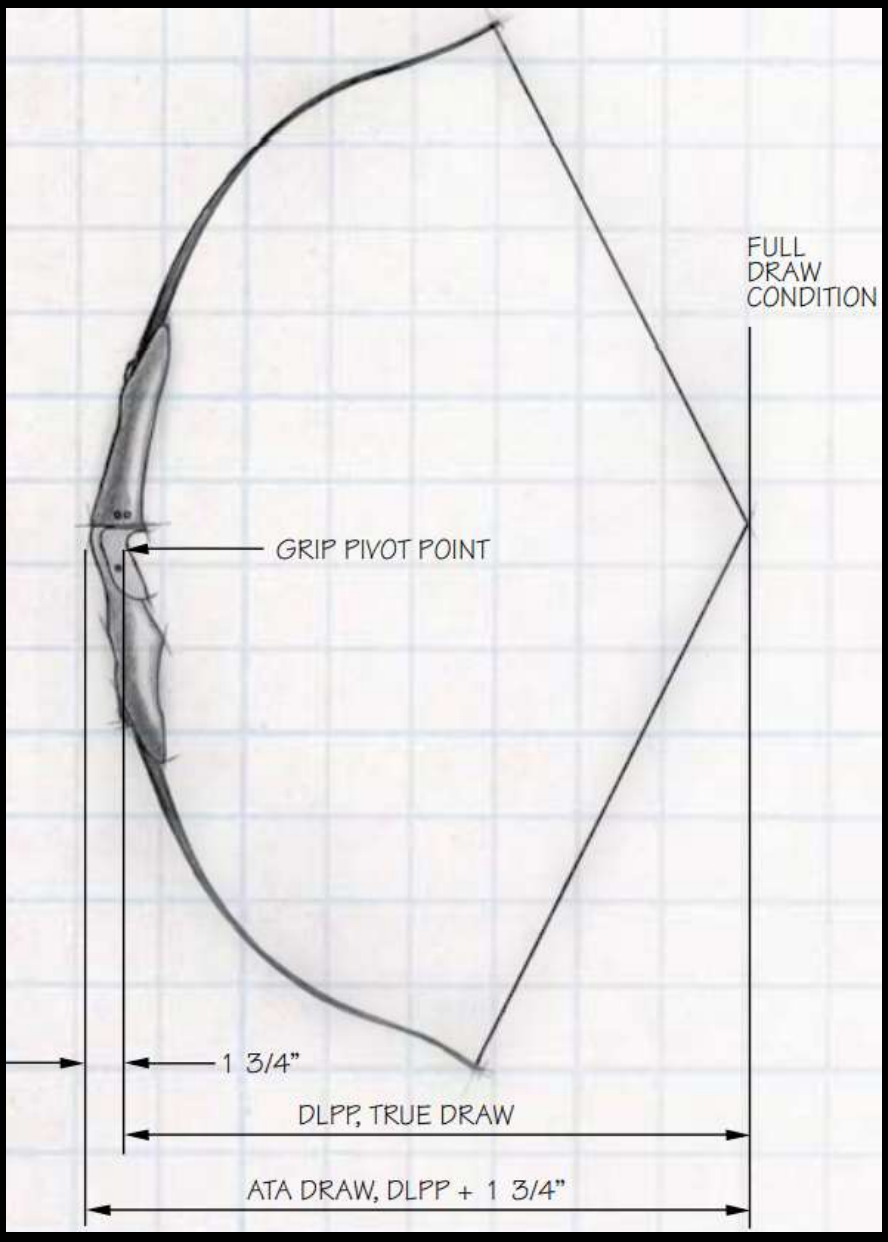

Figure 5 ATA Actual Draw Length

- The ATA definition of draw length is to ensure that it is always a consistent measurement regardless of riser widths. Not all risers are 1.75” wide. For example, if you were to draw an arrow marked at 28” (from nock throat to tip) to the front of the bow and riser was 2.0” wide you would be 0.25” under drawing the bow.

➢ Another important ILF design factor to consider is *riser deflex*. This refers to how far forward the grip sits relative to the limbs. This distance directly affects brace height and the overall *power stroke*. The image below illustrates two different risers and how deflex is measured.

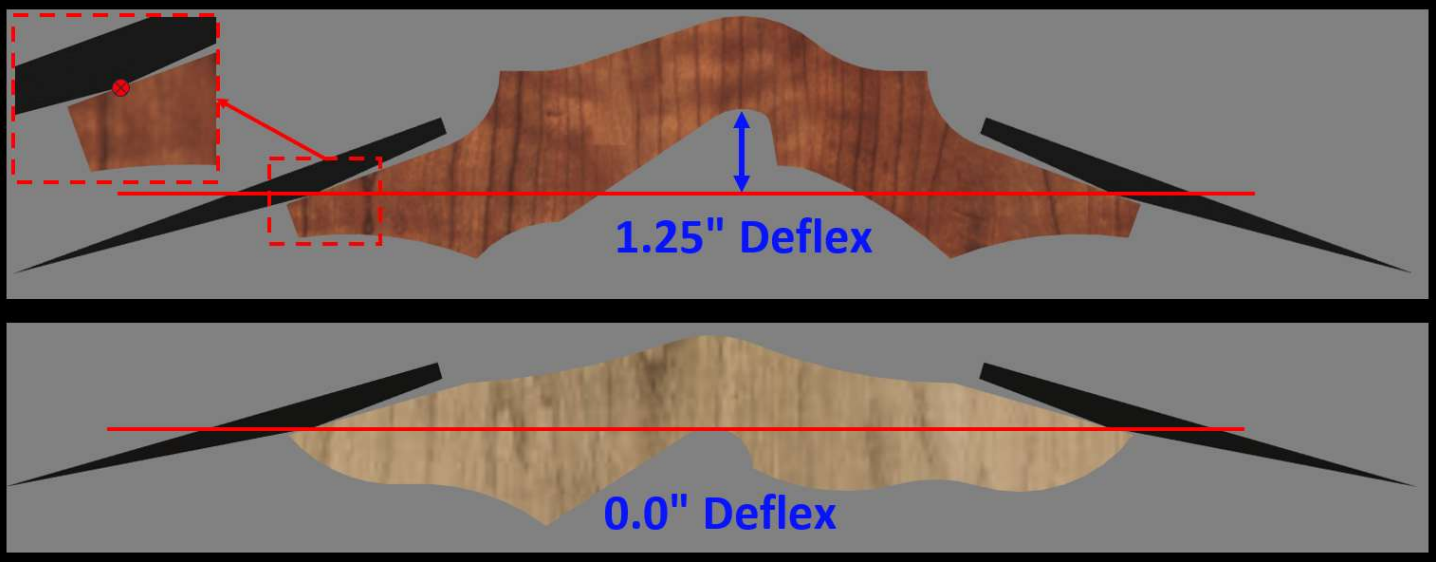

Figure 6 Riser Deflex

- Less deflex increases the power stroke, which in turn causes the limbs to flex more. To ensure the limbs remain within warranty limits, adjust your draw length by adding or subtracting the difference between the nominal deflex (1.25") and your riser’s actual deflex.
  - ♦ Using the example above, the calculation is as follows:

$$Draw\ Length, D = 28"$$

$$Nominal\ Deflex, d_{nom.} = 1.25"$$

$$Actual\ Risers\ Deflex, d_{act.} = 0.0"$$

$$Deflex\ Delta, d_{\Delta} = d_{nom.} - d_{act.} = 1.25 - 0.0 = 1.25"$$

$$Modified\ Draw, D_{mod.} = D + d_{\Delta} = 28 + (1.25) = 29.25"$$ ⬅

❖ The deflex delta also affects brace height. For example, a riser with 1.25" of deflex and an 8" brace height will equate to a 6.75" brace height on a 0.0" deflex riser. This change is not due to the limbs, but is primarily a result of the riser’s design.

➢ Increasing brace height on a lower-deflex riser to match the brace height of a higher-deflex riser can push the limbs out of spec, reduce performance, and potentially void the warranty by bringing the resting string outside of the *string contact length* (See Section 3.3 Figure 15).

- For all limbs, use the following Chart to select limb length for the choice of riser
  - These are minimum length limb and riser for the *modified draw length*.
  - There is no maximum length to any configuration and often for high level target archers they prefer a longer bow for greater forgiveness in string release and more mass moment of inertia to keep bow more still during shot cycle.

3.0 LIMB AND RISER COMBINATIONS FOR GIVEN DRAW LENGTH

DRAW LENGTH : **25** inch					
LIMB SIZE	RISER LENGTH[a] [inch]				
XS	16.0	17.0	18.0	19.0	20.0
S	-	13.0	14.0	15.0	16.0
M	-	-	-	-	-
L	-	-	-	-	-
XL	-	-	-	-	-

DRAW LENGTH : **26** inch					
LIMB SIZE	RISER LENGTH[a] [inch]				
XS	19.0	20.0	21.0	22.0	23.0
S	15.0	16.0	17.0	18.0	19.0
M	-	-	13.0	14.0	15.0
L	-	-	-	-	-
XL	-	-	-	-	-

DRAW LENGTH : **27** inch					
LIMB SIZE	RISER LENGTH[a] [inch]				
XS	22.0	23.0	24.0	25.0	26.0
S	18.0	19.0	20.0	21.0	22.0
M	14.0	15.0	16.0	17.0	18.0
L	-	-	-	13.0	14.0
XL	-	-	-	-	-

DRAW LENGTH : **28** inch					
LIMB SIZE	RISER LENGTH[a] [inch]				
XS	25.0	26.0	27.0	28.0	29.0
S	21.0	22.0	23.0	24.0	25.0
M	17.0	18.0	19.0	20.0	21.0
L	13.0	14.0	15.0	16.0	17.0
XL	-	-	-	-	13.0

DRAW LENGTH : **29** inch					
LIMB SIZE	RISER LENGTH[a] [inch]				
XS	28.0	29.0	-	-	-
S	24.0	25.0	26.0	27.0	28.0
M	20.0	21.0	22.0	23.0	24.0
L	16.0	17.0	18.0	19.0	20.0
XL	-	13.0	14.0	15.0	16.0

DRAW LENGTH : **30** inch					
LIMB SIZE	RISER LENGTH[a] [inch]				
XS	-	-	-	-	-
S	27.0	28.0	29.0	-	-
M	23.0	24.0	25.0	26.0	27.0
L	19.0	20.0	21.0	22.0	23.0
XL	15.0	16.0	17.0	18.0	19.0

DRAW LENGTH : **31** inch					
LIMB SIZE	RISER LENGTH[a] [inch]				
XS	-	-	-	-	-
S	-	-	-	-	-
M	26.0	27.0	28.0	29.0	-
L	22.0	23.0	24.0	25.0	26.0
XL	18.0	19.0	20.0	21.0	22.0

DRAW LENGTH : **32** inch					
LIMB SIZE	RISER LENGTH[a] [inch]				
XS	-	-	-	-	-
S	-	-	-	-	-
M	29.0	-	-	-	-
L	25.0	26.0	27.0	28.0	29.0
XL	21.0	22.0	23.0	24.0	25.0

a. RISER LENGTH IS THE DISTANT BETWEEN THE UPPER AND LOWER DETENT PIN, MEASURING IN A STRAIGHT LINE ACROSS RISER **PLUS 1.25"**. SEE FIGURE 6 IN GUIDE IN GENERAL A 19" INCH RISER TYPICALLY HAS A "RISER LENGTH" OF 19" AND LIKEWISE FOR OTHER RISERS BUT ONE SHOULD MAKE SURE THIS IS TRUE FOR THIER GIVEN RISER.

Chart 1 Limb and Riser Combinations For Nominal 1.25" Deflex Riser

❖ Use the following charts to determine bow lengths and string sizes for each of our limb types

MOAC 3.0 BOW LENGTHS AND STRING SIZES										
Riser Size		13	15	17	19	21	23	25	27	29
Limb Bolt Distance[a]		7.125	9.125	11.125	13.125	15.125	17.125	19.125	21.125	23.125
Detent Pin Distance		11.75	13.75	15.75	17.75	19.75	21.75	23.75	25.75	27.75
Tip to Tip Bow Length[c]	XS	51.6	53.6	55.6	57.6	59.6	61.6	63.6	65.6	67.6
	S	52.5	54.5	56.5	58.5	60.5	62.5	64.5	66.5	68.5
	M	53.4	55.4	57.4	59.4	61.4	63.4	65.4	67.4	69.4
	L	54.4	56.4	58.4	60.4	62.4	64.4	66.4	68.4	70.4
	XL	55.3	57.3	59.3	61.3	63.3	65.3	67.3	69.3	71.3
String Contact Length [SCL][b]	XS	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03
	S	7.53	7.53	7.53	7.53	7.53	7.53	7.53	7.53	7.53
	M	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03
	L	8.53	8.53	8.53	8.53	8.53	8.53	8.53	8.53	8.53
	XL	9.03	9.03	9.03	9.03	9.03	9.03	9.03	9.03	9.03
AMO Bow Length	XS	56.00	58.00	60.00	62.00	64.00	66.00	68.00	70.00	72.00
	S	58.00	60.00	62.00	64.00	66.00	68.00	70.00	72.00	74.00
	M	60.00	62.00	64.00	66.00	68.00	70.00	72.00	74.00	76.00
	L	62.00	64.00	66.00	68.00	70.00	72.00	74.00	76.00	78.00
	XL	64.00	66.00	68.00	70.00	72.00	74.00	76.00	78.00	80.00
Actual Loaded String Length[d]	XS	53.00	55.00	57.00	59.00	61.00	63.00	65.00	67.00	69.00
	S	55.00	57.00	59.00	61.00	63.00	65.00	67.00	69.00	71.00
	M	57.00	59.00	61.00	63.00	65.00	67.00	69.00	71.00	73.00
	L	59.00	61.00	63.00	65.00	67.00	69.00	71.00	73.00	75.00
	XL	61.00	63.00	65.00	67.00	69.00	71.00	73.00	75.00	77.00

a. RISER SIZES LISTED ARE THE MANUFACTURER REFERENCE SIZE. ACTUAL LIMB BOLT DISTANCE CAN VARY FROM MANUFACTURER TO MANUFACTURER. LIMB BOLT DISTANCE IS THE DISTANCE FROM UPPER LIMB BOLT TO LOWER LIMB BOLT USING A STRAIGHT RULER, NOT FOLLOWING THE CURVATURE. LIMB BOLT LOCATION OF MEASURE IS WHERE THE BOLT ENTERS THE RISER. ADD OR SUBTRACT THE DELTA TO ACTUAL STRING LENGTH.

b. SCL IS THE **GOLD STANDARD** TO ACHIEVING THE **IDEAL BRACE**. THIS IS MEASURED FROM THE STRING LOOP AT TIP OF BOW DOWN THE LIMB FOLLOWING THE CURVATURE OF BELLY SIDE OF LIMB. LIMBS COME WITH BLACK BAR ON BELLY SIDE MEASURING 5/8" WIDE FOR A RANGE OF +/-0.25" BRACE. GOING OUTSIDE OF SCL WILL **VOID THE WARRANTY**.

c. MEASURED STRAIGHT ACROSS FROM UPPER LIMB TIP TO LOWER LIMB TIP.

d. MEASURED LENGTH OF STRING UNDER 100# OF LOAD AND EACH LOOP AROUND A 0.375" DOWEL. MEASUREMENT TAKEN AT OUTSIDE DIAMETER OF DOWEL.

BACKWOODS COMPOSITES

Chart 2 MOAC Bow Lengths and String Sizes

TAC 3.0 BOW LENGTHS AND STRING SIZES										
Riser Size		13	15	17	19	21	23	25	27	29
Limb Bolt Distance[a]		7.125	9.125	11.125	13.125	15.125	17.125	19.125	21.125	23.125
Detent Pin Distance		11.75	13.75	15.75	17.75	19.75	21.75	23.75	25.75	27.75
Tip to Tip Bow Length[c]	XS	50.9	52.9	54.9	56.9	58.9	60.9	62.9	64.9	66.9
	S	51.8	53.8	55.8	57.8	59.8	61.8	63.8	65.8	67.8
	M	52.8	54.8	56.8	58.8	60.8	62.8	64.8	66.8	68.8
	L	53.7	55.7	57.7	59.7	61.7	63.7	65.7	67.7	69.7
	XL	54.6	56.6	58.6	60.6	62.6	64.6	66.6	68.6	70.6
String Contact Length [SCL][b]	XS	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22
	S	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45
	M	6.69	6.69	6.69	6.69	6.69	6.69	6.69	6.69	6.69
	L	6.92	6.92	6.92	6.92	6.92	6.92	6.92	6.92	6.92
	XL	7.15	7.15	7.15	7.15	7.15	7.15	7.15	7.15	7.15
AMO Bow Length	XS	53.75	55.75	57.75	59.75	61.75	63.75	65.75	67.75	69.75
	S	55.75	57.75	59.75	61.75	63.75	65.75	67.75	69.75	71.75
	M	57.75	59.75	61.75	63.75	65.75	67.75	69.75	71.75	73.75
	L	59.75	61.75	63.75	65.75	67.75	69.75	71.75	73.75	75.75
	XL	61.75	63.75	65.75	67.75	69.75	71.75	73.75	75.75	77.75
Actual Loaded String Length[d]	XS	50.75	52.75	54.75	56.75	58.75	60.75	62.75	64.75	66.75
	S	52.75	54.75	56.75	58.75	60.75	62.75	64.75	66.75	68.75
	M	54.75	56.75	58.75	60.75	62.75	64.75	66.75	68.75	70.75
	L	56.75	58.75	60.75	62.75	64.75	66.75	68.75	70.75	72.75
	XL	58.75	60.75	62.75	64.75	66.75	68.75	70.75	72.75	74.75

a. RISER SIZES LISTED ARE THE MANUFACTURER REFERENCE SIZE. ACTUAL LIMB BOLT DISTANCE CAN VARY FROM MANUFACTURER TO MANUFACTURER. LIMB BOLT DISTANCE IS THE DISTANCE FROM UPPER LIMB BOLT TO LOWER LIMB BOLT USING A STRAIGHT RULER, NOT FOLLOWING THE CURVATURE. LIMB BOLT LOCATION OF MEASURE IS WHERE THE BOLT ENTERS THE RISER. ADD OR SUBTRACT THE DELTA TO ACTUAL STRING LENGTH.

b. SCL IS THE **GOLD STANDARD** TO ACHIEVING THE **IDEAL BRACE**. THIS IS MEASURED FROM THE STRING LOOP AT TIP OF BOW DOWN THE LIMB FOLLOWING THE CURVATURE OF BELLY SIDE OF LIMB. LIMBS COME WITH BLACK BAR ON BELLY SIDE MEASURING 5/8" WIDE FOR A RANGE OF +/-0.25" BRACE. GOING OUTSIDE OF SCL WILL **VOID THE WARRANTY**.

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BACKWOODS COMPOSITES

Chart 3 TAC Bow Lengths and String Sizes

CAC 3.0 BOW LENGTHS AND STRING SIZES										
Riser Size		13	15	17	19	21	23	25	27	29
Limb Bolt Distance[a]		7.125	9.125	11.125	13.125	15.125	17.125	19.125	21.125	23.125
Detent Pin Distance		11.75	13.75	15.75	17.75	19.75	21.75	23.75	25.75	27.75
Tip to Tip Bow Length[c]	XS	50.6	52.6	54.6	56.6	58.6	60.6	62.6	64.6	66.6
	S	51.6	53.6	55.6	57.6	59.6	61.6	63.6	65.6	67.6
	M	52.5	54.5	56.5	58.5	60.5	62.5	64.5	66.5	68.5
	L	53.4	55.4	57.4	59.4	61.4	63.4	65.4	67.4	69.4
	XL	54.4	56.4	58.4	60.4	62.4	64.4	66.4	68.4	70.4
String Contact Length [SCL][b]	XS	5.03	5.03	5.03	5.03	5.03	5.03	5.03	5.03	5.03
	S	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16
	M	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28	5.28
	L	5.41	5.41	5.41	5.41	5.41	5.41	5.41	5.41	5.41
	XL	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53
AMO Bow Length	XS	52.00	54.00	56.00	58.00	60.00	62.00	64.00	66.00	68.00
	S	54.00	56.00	58.00	60.00	62.00	64.00	66.00	68.00	70.00
	M	56.00	58.00	60.00	62.00	64.00	66.00	68.00	70.00	72.00
	L	58.00	60.00	62.00	64.00	66.00	68.00	70.00	72.00	74.00
	XL	60.00	62.00	64.00	66.00	68.00	70.00	72.00	74.00	76.00
Actual Loaded String Length[d]	XS	49.00	51.00	53.00	55.00	57.00	59.00	61.00	63.00	65.00
	S	51.00	53.00	55.00	57.00	59.00	61.00	63.00	65.00	67.00
	M	53.00	55.00	57.00	59.00	61.00	63.00	65.00	67.00	69.00
	L	55.00	57.00	59.00	61.00	63.00	65.00	67.00	69.00	71.00
	XL	57.00	59.00	61.00	63.00	65.00	67.00	69.00	71.00	73.00

a. RISER SIZES LISTED ARE THE MANUFACTURER REFERENCE SIZE. ACTUAL LIMB BOLT DISTANCE CAN VARY FROM MANUFACTURER TO MANUFACTURER. LIMB BOLT DISTANCE IS THE DISTANCE FROM UPPER LIMB BOLT TO LOWER LIMB BOLT USING A STRAIGHT RULER, NOT FOLLOWING THE CURVATURE. LIMB BOLT LOCATION OF MEASURE IS WHERE THE BOLT ENTERS THE RISER. ADD OR SUBTRACT THE DELTA TO ACTUAL STRING LENGTH.

b. SCL IS THE **GOLD STANDARD** TO ACHIEVING THE **IDEAL BRACE**. THIS IS MEASURED FROM THE STRING LOOP AT TIP OF BOW DOWN THE LIMB FOLLOWING THE CURVATURE OF BELLY SIDE OF LIMB. LIMBS COME WITH BLACK BAR ON BELLY SIDE MEASURING 5/8" WIDE FOR A RANGE OF +/-0.25" BRACE. GOING OUTSIDE OF SCL WILL **VOID THE WARRANTY**.

c. MEASURED STRAIGHT ACROSS FROM UPPER LIMB TIP TO LOWER LIMB TIP.

d. MEASURED LENGTH OF STRING UNDER 100# OF LOAD AND EACH LOOP AROUND A 0.375" DOWEL. MEASUREMENT TAKEN AT OUTSIDE DIAMETER OF DOWEL.

BACKWOODS COMPOSITES

Chart 4 CAC Bow Lengths and String Sizes

TAL 3.0 BOW LENGTHS AND STRING SIZES										
Riser Size		13	15	17	19	21	23	25	27	29
Limb Bolt Distance[a]		7.125	9.125	11.125	13.125	15.125	17.125	19.125	21.125	23.125
Detent Pin Distance		11.75	13.75	15.75	17.75	19.75	21.75	23.75	25.75	27.75
Tip to Tip Bow Length[B]	XS	50.50	52.50	54.50	56.50	58.50	60.50	62.50	64.50	66.50
	S	52.50	54.50	56.50	58.50	60.50	62.50	64.50	66.50	68.50
	M	54.50	56.50	58.50	60.50	62.50	64.50	66.50	68.50	70.50
	L	56.50	58.50	60.50	62.50	64.50	66.50	68.50	70.50	72.50
	XL	58.50	60.50	62.50	64.50	66.50	68.50	70.50	72.50	74.50
AMO Bow Length	XS	52.00	54.00	56.00	58.00	60.00	62.00	64.00	66.00	68.00
	S	54.00	56.00	58.00	60.00	62.00	64.00	66.00	68.00	70.00
	M	56.00	58.00	60.00	62.00	64.00	66.00	68.00	70.00	72.00
	L	58.00	60.00	62.00	64.00	66.00	68.00	70.00	72.00	74.00
	XL	60.00	62.00	64.00	66.00	68.00	70.00	72.00	74.00	76.00
Actual Loaded String Length[c]	XS	49.00	51.00	53.00	55.00	57.00	59.00	61.00	63.00	65.00
	S	51.00	53.00	55.00	57.00	59.00	61.00	63.00	65.00	67.00
	M	53.00	55.00	57.00	59.00	61.00	63.00	65.00	67.00	69.00
	L	55.00	57.00	59.00	61.00	63.00	65.00	67.00	69.00	71.00
	XL	57.00	59.00	61.00	63.00	65.00	67.00	69.00	71.00	73.00

a. RISER SIZES LISTED ARE THE MANUFACTURER REFERENCE SIZE. ACTUAL LIMB BOLT DISTANCE CAN VARY FROM MANUFACTURER TO MANUFACTURER. LIMB BOLT DISTANCE IS THE DISTANCE FROM UPPER LIMB BOLT TO LOWER LIMB BOLT USING A STRAIGHT RULER, NOT FOLLOWING THE CURVATURE. LIMB BOLT LOCATION OF MEASURE IS WHERE THE BOLT ENTERS THE RISER. ADD OR SUBTRACT THE DELTA TO ACTUAL STRING LENGTH.

b. MEASURED STRAIGHT ACROSS FROM UPPER LIMB TIP TO LOWER LIMB TIP.

c. MEASURED LENGTH OF STRING UNDER 100# OF LOAD AND EACH LOOP AROUND A 0.375" DOWEL.

BACKWOODS COMPOSITES

Chart 5 TAL Bow Lengths and String Sizes

- When determining string size from the charts be mindful of the defined riser sizes. Not all manufactures measure risers the same way. We define the riser length as limb/tiller bolt distance plus 5.63".
- ***You may need to adjust for the actual length of the riser for correct string size. We have found 100% of risers available on market do not follow a standard because there is none!!!***

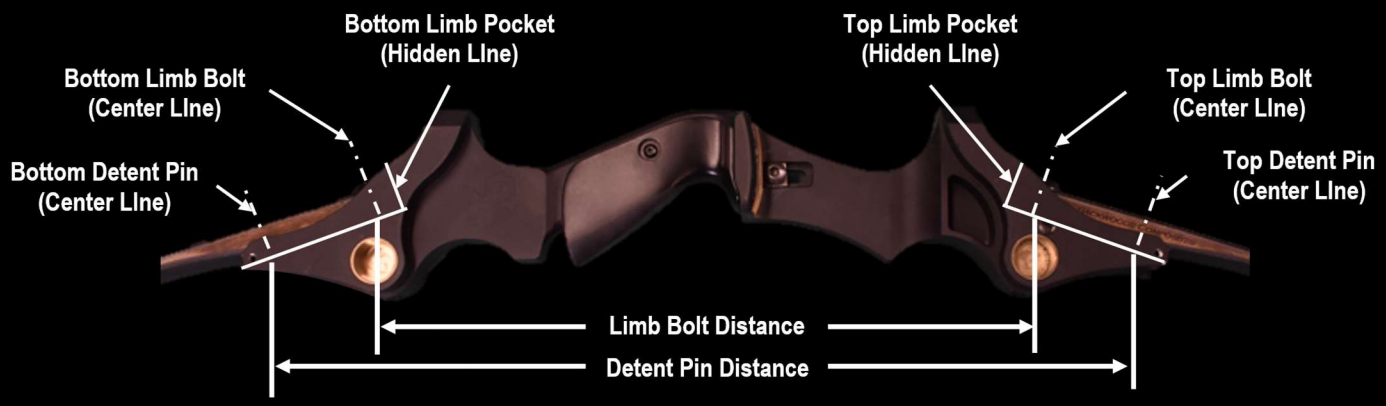


Figure 7 Limb Bolt Distance Measurement

- Things to note regarding limb type.
  - TAC limbs are 1 inch shorter than MOAC limbs.
    - This equates to approximately 2 inches of AMO bow length
  - CAC limbs are 2 inches shorter than MOAC limbs.
    - This equates to approximately 4 inches of AMO bow length
  - MOAC limbs have about 1.5" smaller working envelope than TAC's given the same AMO bow length. This is due to the more aggressive hook in the MOAC limbs
    - MOAC limbs have about 2.5" smaller working envelope than CAC limbs
  - Listed below is the acceptable brace heights ranges.
    - MOAC : ±0.375"
    - TAC : ±0.625"
    - CAC : ±0.875"
    - TAL : : ±0.875"
  - The archer has a greater window for tuning arrows with a limb with higher acceptable brace height.
    - Higher brace has been shown to contribute to an increase in accuracy but at the sacrifice of speed.
- Limb and Riser Selection Example:
  - If you have a 29" draw, want to use a 17" riser, have a fixed draw location on string and want the fastest limb we offer then your choice is MOAC 3.0.0 L's. That would yield a 66 AMO length bow and you should either order a 66 AMO string or 61" long actual string size.
  - If you have a 27" draw, want to use 25" riser, string walk and want the most accurate across various distances then your choice is TAC 3.0 XS. That would yield a 66 AMO length bow and you should either order a 66 AMO string or 63" actual string size.
    - Note a longer limb is still typically chosen over speed due to finger release forgiveness
  - If you have a 30" draw, want to use 27" riser, string walk and want the most accurate with a single distance then your choice is CAC 3.0 M. That would yield a 70 AMO length bow and you should either order a 70 AMO string or 67" actual string size.
    - Note a longer limb is still typically chosen over speed due to finger release forgiveness
  - For longbow limbs we recommend for 27" draw or longer use "XL" size for risers 13-21". For 23-25" risers use "L" limbs and 27-29" risers use "M" limbs.
  - We have tried to determine the most optimal size for your goal. We do not recommend going outside of these limb/riser combinations unless you are increasing the total bow length.
    - If you desire to shoot a riser shorter than our recommendations, please contact us so we can help you and keep you from possibly damaging limbs. ***Failure to get approval of bracing/stringing/shooting a limb on a riser size not recommended without contacting us first will void any warranty!!!***

3 MOAC/TAC/CAC LIMBS AND RISER SET UP

3.1 HIT-19 Riser (also mostly applicable to all other risers)

- ***Limb tiller bolts should be set at the mid-range when first setting up riser!!!***
  - To set limb tiller mid-range remove both top and bottom limb tiller set screws located on the **belly** side of riser screwed into the threaded tiller bolt hole as shown in figure below

Figure 8 Tiller Set Screw

- Turn tiller bolts until they bottom out, being careful not to over tighten bolt. Damage could occur to the brass sleave. This is only to locate "bottomed out or max'ed out" condition. This is the most ***tiller*** sensitive position and it is not recommended to shoot MOAC's limbs at this "bottomed out" condition. TAC's limbs can be shot at this tiller location without creating a tiller sensitive situation, as TAC limbs are designed to be less tiller sensitive than MOAC's.
- After tiller bolts have reached the "bottomed out" condition, turn bolts out 3.5 complete turns and re-insert tiller bolt set screws to lock in this tiller location. ***The most turns out for HIT-19 riser is 7 turns!!!***
  - Remember to do this on both limbs. See following Figure.

Figure 9 Three Turns Out Condition

- Make sure both limb alignment plates are in the middle
  - We will tell you how to adjust this later for any mis-alignment. See following Figure.

Figure 10 Limb Alignment Plates Middle

3.2 String Size and Type

- Determine estimated ***AMO Proper String Length*** before stringing up bow. Use supplied charts.
  - String makers will either sell strings using an ATA (formerly AMO) size or an actual string size. This does not matter. Both sizes are defined in our charts. AMO size is simply 3 inches longer than actual string size. Per ATA standards actual string size is measured, regardless of material, "…under 100 lbs (±1 pound) tension…for 20 seconds…measuring…from the outside edge to edge of two ¼" steel pins." See following Figure. (Ref. 1)

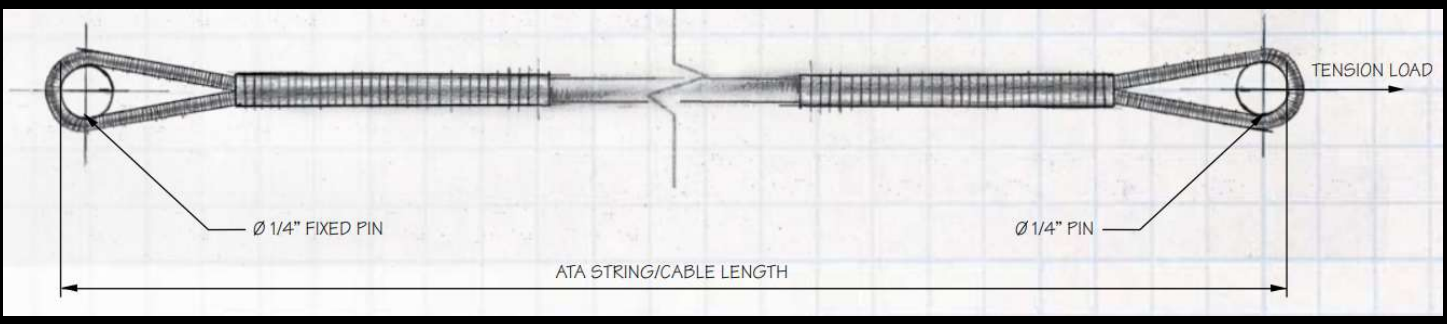


Figure 11 ATA String Length

- Note: ATA string size does not always equal to bow length. It can be more or less, but ATA string size is a good estimate on bow size.

➢ Before stringing up place one string loop on bottom string tip groove and wrap other loop end towards upper string tip groove. The distance from the tip string tip groove to the loop should be approximately 3 to 2.8" (MOAC:2.8", TAC:2.9" & CAC:3.0"). This is a good check before you attempt to string bow up with an extremely short string, that which can damage the limbs. See following Figure.

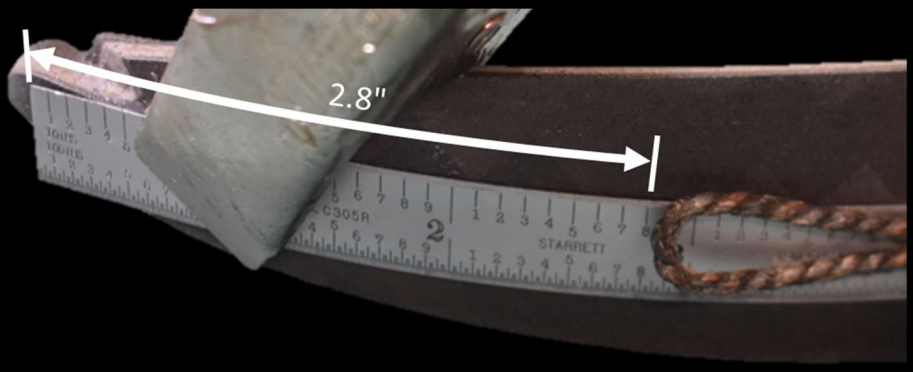


Figure 12 Estimated String Length Measurement

❖ We are confident our limb construction is of higher quality and made of more advanced materials than other limbs. So, we are not so picky on string types and offer a range of recommendations. Listed below are string materials we recommend.

- ➢ HMPE Spectra Fiber
  - BCY 652 Spectra
  - Brownell Fastflight Plus
- ➢ SK60 Izanas Fiber
  - Archer Angle Japan ASB Dyneema and ASB Majesty
- ➢ SK75 Dyneema Fiber
  - BCY 8125
  - BCY DynaFLIGHT 97
  - Brownell Rhino
- ➢ SK71 Izanas Fiber
  - Archery Angle Japan ASB Majesty Pro
- ➢ SK99 Dyneema Fiber
  - BCY Mercury
  - Bloodline B99
  - Brownell Rampage
- ➢ Vectran Blends
  - BCY 452x and 450 Plus
  - BCY X99 and 454
  - Bloodline Valor 99 (Vec 99)

❖ For silencing the bow, we recommend either using a heavier arrow or a heavier string (more strands). This is the best solution instead of adding in string silencers. Heavier arrows will yield higher efficiency and quiet the bow. A heavier string will offer higher durability and quiet the bow. Doing both will give you an efficient and dependable bow.

- We recommend string twist rates in the range of 0.5” to 0.75” and only warrant limbs with string twist rates in the range of 0.25” to 1.0”

3.3 Bracing/Stringing Up Bow

- Top limb is marked with “*BACKWOODS COMPOSITES*” and “*TOP-B C*”. Bottom limb is marked with poundage and size, “A - B C / D - E#@28”H where,
  - A : Limb Model
  - B : Version (ex. 3.0 is “J”)
  - C : Serial
  - D : Limb Length
  - E : Limb poundage
  - H : Rated on 19” riser (no “H” limbs are rated on 25” riser)

Figure 13 Limb Markings Top and Bottom Limb

- Recurve Limbs :
  - We recommend always using a ***bow stringer*** for all recurve limbs and the supplied stringer (recurves only) from Backwoods Composites is designed to evenly distribute the strain on each limb during this operation. See following Figure.

Figure 14 "Big Hooker Stringer" Even Limb Strain Stringer

- After stringing up bow immediately pull bow back about 2-4 inches and dry fire bow, do this three times. This helps seat the limbs properly into the ILF connections.
  - ***Do this every time you string up bow!!!***
- After the 2-4" ***dry fire***, grip bow riser firmly with bow hand and grip string firmly with drawing hand and pull back three times. This helps stabilize tiller for the first real draw.
  - ***Do this every time you string up bow!!!***
- Check "***String Contact Length***" black bar on belly side of limbs.
  - String should come off the limbs within the black SCL bar on both limbs, see Figure below.
    - There is no need to check ***brace*** when using this system of measurement, but if you want to double check the estimated brace in the charts provided you can do so. Keep in mind all risers are built different and the brace presented in charts is only an estimate. See following Figure.

Figure 15 String Contact Length, "SCL"

  - If the string is coming off the bow early, meaning your string is closer to the string ***belly string grooves***, you need to untwist the string.
  - If the string is coming off the bow late, meaning your string is closer to the riser, you need to twist the string.
    - Optimal twist we recommend is somewhere between 0.75" per twist to 1.5" per twist. Too many twists or too less twists can damage bow

- Longbow Limbs :
  - Using our "Axially Loaded String Length" from Chart 5 will typically yield perfect middle ground brace. Brace should only be moved ±0.875" from this position.
  - A method we prefer to find most optimum brace from the middle ground is to untwist string to reduce brace by 0.875". Then pull back bow 3" and dry fire, if you hear string contacting limbs increase brace with two twists. Keep doing this till you no longer hear string contacting limbs.
- All Limbs :
  - We do not list brace heights in our charts because of the high variability of deflex in risers across all brands and brace is highly dependent on riser deflex. Deflex measurement is shown in the following Figure for a visual.

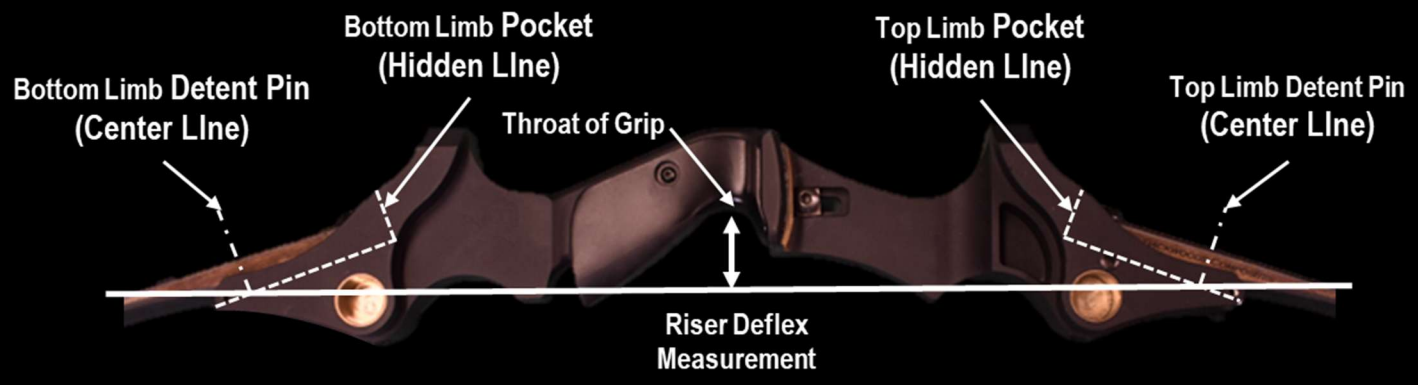


Figure 16 Riser Deflex Measurement

- If your riser has a larger deflex, measured brace will increase
- If your riser has a smaller deflex, measured brace will decrease
- Remember when changing risers but keeping same limbs may not yield same brace due to the change in deflex.

3.4 Initial Tiller and Limb Alignment Set Up

- Tiller setting must be correct for you style of shooting. ***NOT EVERYBODY is the SAME!!!! Nor is EVERY LIMB BUILT THE SAME!!! Nor is EVERY RISER BUILT THE SAME!!!***
  - Check built in **bow system** tiller by measuring as shown in the following Figure the two locations shown and the equation shown to calculate Static Tiller.

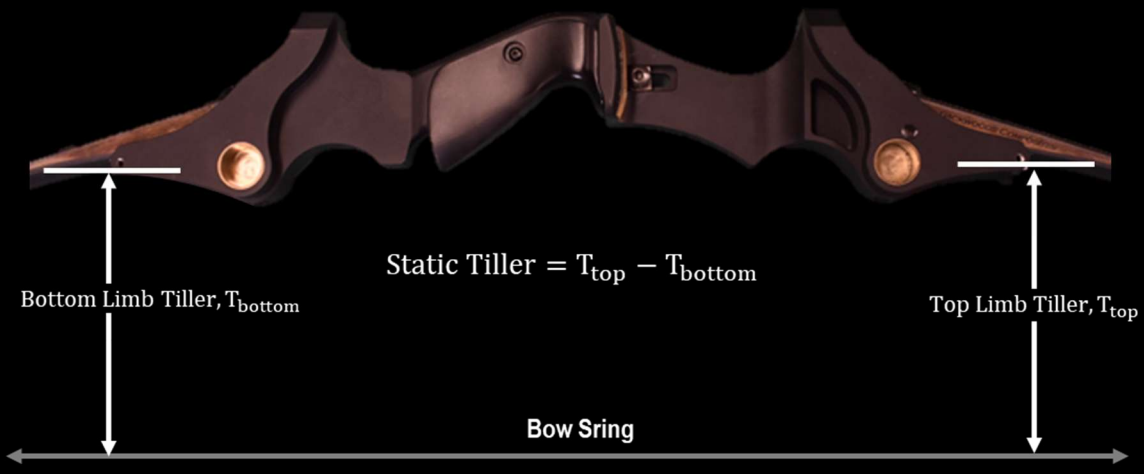


Figure 17 Tiller Measurement Locations

  - Note, depending on the type of limb and the desired ***built-in tiller*** this measurement is typically "***positive tiller***" and will be between 0 to +1/8.
  - Also, due to manufacturing tolerances the risers could also have a built-in tiller. Which is why we state "built-in **Bow System** tiller"
  - Positive Tiller means the top limb measurement is greater than the bottom limb measurement. For example, if the top limb is measured 5.25" and lower limb is measured 5.125" you have a "Positive 1/8" Tiller".
  - See recommended tiller settings in the following Chart.

RELEASE STYLE	RANGE	
Split	+1/8	+3/8
3 Under	0	+1/4
Fixed Crawl 1"	-1/8	+1/8
THESE ARE ONLY ESTIMATES		

Chart 6 Static Tiller Recommendations

- For ***string walking*** we suggest you set tiller to be the most optimum for the most commonly shot distance you will encounter for the intended target/targets.

❖ Limb alignment is critical for good arrow flight and can have an effect on dynamic tiller if alignment is off.

➢ With bow strung, stare down the belly side of riser and visually inspect the string alignment to the center of the two tiller set screw holes.

- String should be running through both bolts down the centerline of the holes.
- If it is not, then adjust the limb alignment plate to bring the string to the centerline.

➢ Due to the string grooves located on the belly of the limbs and our limbs having an optimum torsional stiffness designed, it is hard to inspect alignment issues when drawing the bow back. It is always best to visually look at the static undrawn bow from the belly side to see mis-alignment. See following Figure of example of correct limb alignment

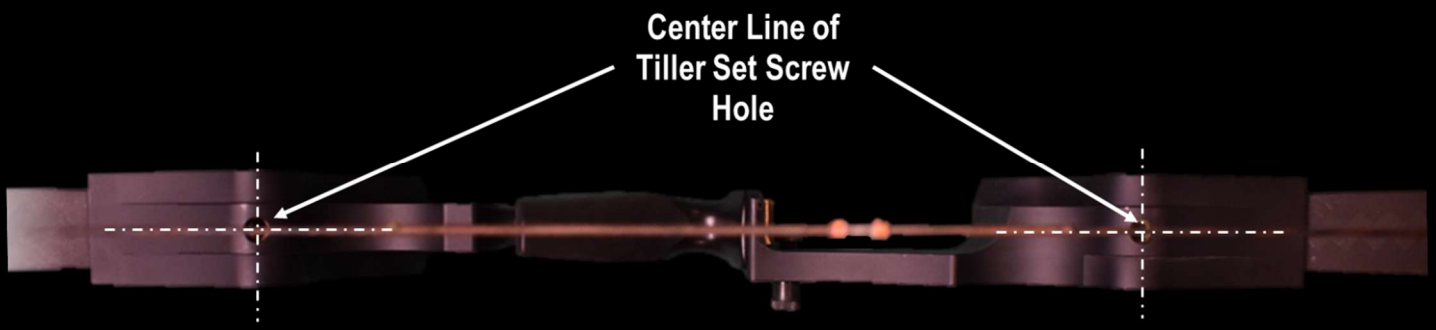


Figure 18 Limb Alignment Check

3.5 Nock Set Location

❖ From our years of experience in archery and building our bows we have found nock height is highly dependent on many variables. These variables include but are not limited too; bow type, length, amount of limb reflex, shooter style of release, shooter grip, arrow sizes, nock types and arrow spines.

❖ We have found that anywhere between ¼" to ¾" is within normal range. If you feel you have to go to a higher-than-normal nock height you most likely have a ***static or dynamic tiller*** issue. Please contact us and we can help you.

❖ Nock set location measurement can be seen in the following Figure.

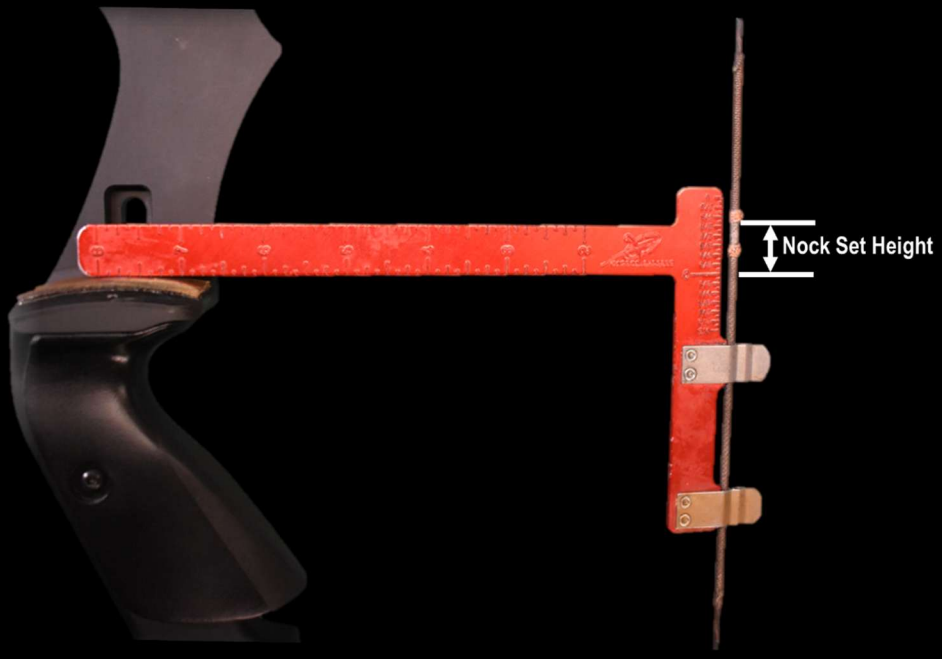


Figure 19 Nock Set Measurement

- Things to remember when adjusting nock set location is,
  - Dynamic tiller will change in draw back, static hold and arrow launch.
  - Adjusting one limb tiller bolts or both opposite will move nock location.
  - Keep in mind your arrow diameter. A micro-diameter shaft will have a lower nock set location than a fat-diameter arrow.
  - You should never tell yourself or anyone else a certain nock set location works on all bows. It can, will and should be different depending on the bow system.

3.6 Tiller Adjustment for Bow System and Archer

- Read this entire section before modification of the tiller bolts from the initial set up. At the end we have a step-by-step process defined.
- ***We always recommend starting this process at the midway of bolts!!!***
  - Go to section 3.4 if you need to review how to set initial tiller at the midway of tiller bolts.
- When drawing the bow back and shooting pay attention to the following
  - Grip pressure shift
  - ***Riser rocking***
  - Bow sound
    - ***We recommend you do not shoot bow until you no longer feel grip pressure shift or riser rocking!!!***
- Any of these felt indicates the dynamic draw tiller needs to be corrected to your shooting form, style shooting, and body mechanics.
- The easiest one to feel is riser rocking.
  - If the riser rotates back, as in the top of the riser comes towards you, the bottom limb is too weak.
    - Should turn upper limb out
  - If the riser rotates forward, as in the top of the riser moves away from you, the top limb is too week.
    - Should turn lower limb out

- ❖ Grip pressure is felt in the grip, you will feel a slight shift in grip pressure because of a small amount of riser rocking.
  - ➢ If pressure increases in the throat, the bottom limb is too weak.
    - Should turn upper limb out
  - ➢ If pressure increases in the palm, the top limb is too weak.
    - Should turn lower limb out
- ❖ Bow sound is the toughest of the three to get a good feel on and does not indicate which limb is weak/stiff.
  - ➢ If the bow is loud or "twangy" then you most likely still have a tiller issue. (Assuming your string is of good quality and correct size).
    - This is most likely because your tiller is so close that grip pressure or riser rock cannot pick it up. To fix this, turn a bolt 1/16th and see if it improves. Indicate if it got better, worse or no change. If better, go a little more. If worse, your first guess was wrong. Turn bolt back 1/16th and then another 1/16th in same direction.
- ❖ Tiller can be adjusted while the bow is strung up. The hardened bearing bronze material used in the barrel nut is designed to be able to withstand turning the bolt in and out with out damage to threads. Just be sure you do not turn bolts out from bottom 8 or more turns.
- ❖ Step by Step Tiller Adjustment Guide

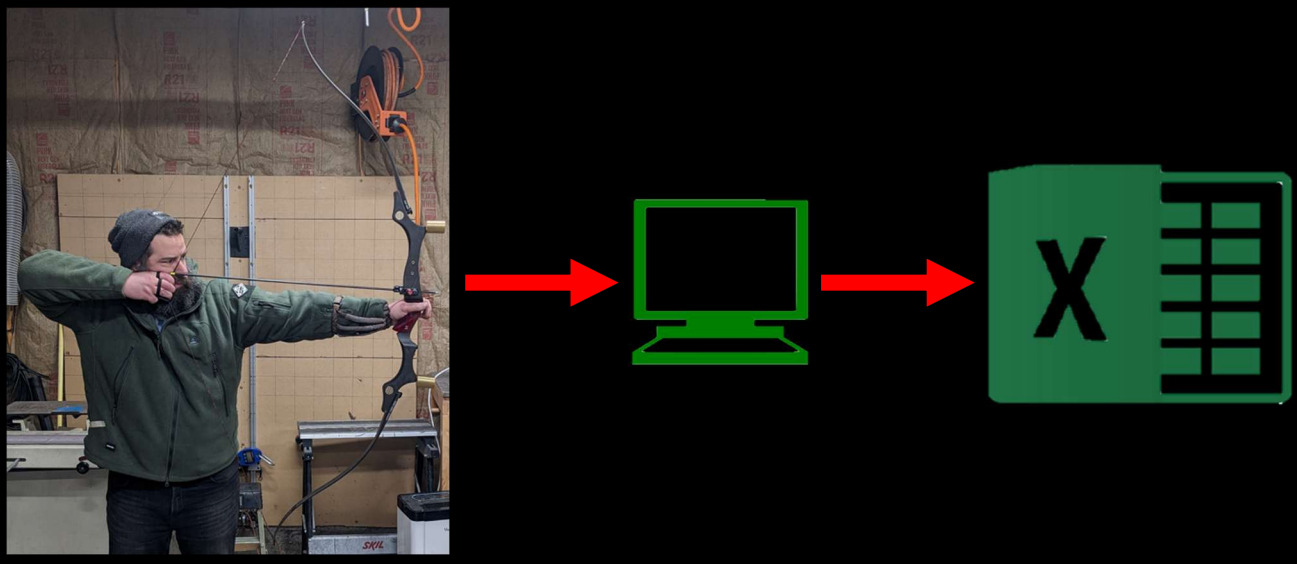
1. Draw bow back
2. Feel for grip pressure shift or riser rocking
   - 2.1. If there is a shift or rock determine which limb is weak and adjust one tiller bolt at a time
     - 2.1.1. If the riser rotates back, as in the top of the riser comes towards you, the bottom limb is too weak.
       - 2.1.1.1. Turn out bottom limb 1/4th turn
       - 2.1.1.2. Draw bow back again
       - 2.1.1.3. Repeat 2.1.1.1 – 2.1.1.2 until shift or rock either no longer exist or now has changed directions
     - 2.1.2. If the riser rotates forward, as in the top of the riser moves away from you, the top limb is too weak.
       - 2.1.2.1. Turn out top limb 1/4th turn
       - 2.1.2.2. Draw back bow again
       - 2.1.2.3. Repeat 2.1.2.1 - 2.1.2.2 until shift or rock either no longer exist;
3. Shoot bow
   - 3.1. Listen for how the bow sounds
     - 3.1.1. If it's a sharp twang, tiller may still be out.
       - 3.1.1.1. If tiller is out, make small 1/16th turns on one bolt until sound changes to a dull thud. We believe it is best at this point to turn out the same bolt you first had to adjust.
4. Enjoy.
5. When using this guide, we believe it is always best to work the tiller bolts out from midway first until good tiller is achieved. You can equally turn bolts in after tiller is set to achieve faster arrow flight. Just note though the closer to bottoming tiller bolts the greater the tiller sensitivity is.

3.7 Advance Full Draw Tiller Adjustment Method

- ❖ This method will allow the archer to narrow in his/her tiller more than the previous method. I have found this is the only way to ensure the archers limbs are pulling back equally. Below is the step-by-step guide.
  - ➢ Cell phone and MS Excel was used in this step-by-step explanation.

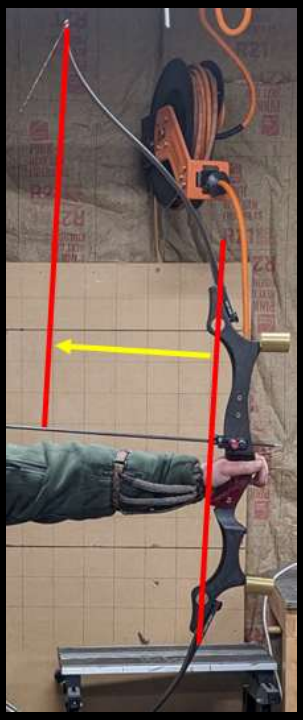
1. Complete the step-by-step guide at the end of Section 3.6 with nock set located initially at 5/16"
   - 1.1. You want your bow system to be tillered close enough that you physically can't tell if the tiller is close to perfect.

2. Bare shaft tune your arrows and bow
    2.1. There are many instructions out there on bare shaft tuning and at this time will not be giving a step-by-step instruction on. But we do believe for nock high or nock low you should ONLY adjust your nock height location to achieve a slightly nock high reading. Also, we believe you should also have a slightly weak arrow reading (left for right-handed and right for left-handed release). If you want to use tiller bolts to adjust weak or stiff arrow reading you should EQUALLY turn both to achieve good arrow flight.
3. Measure your current nock height
    3.1. This most likely changed from 5/16”
4. Draw bow and take picture as seen in figure below, then send to a computer and then open up in software capable for drawing lines.

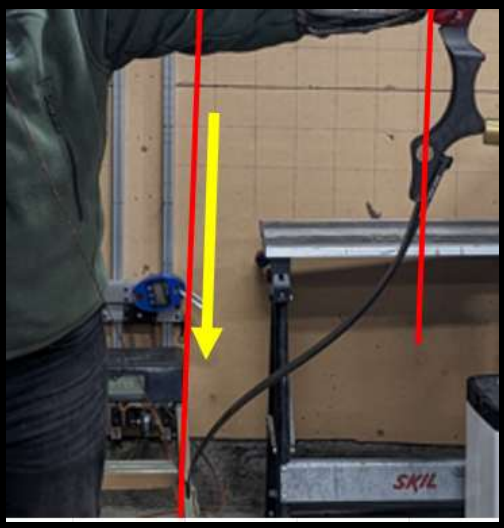


5. Draw a line through two symmetrical points on upper half of riser and lower half of riser

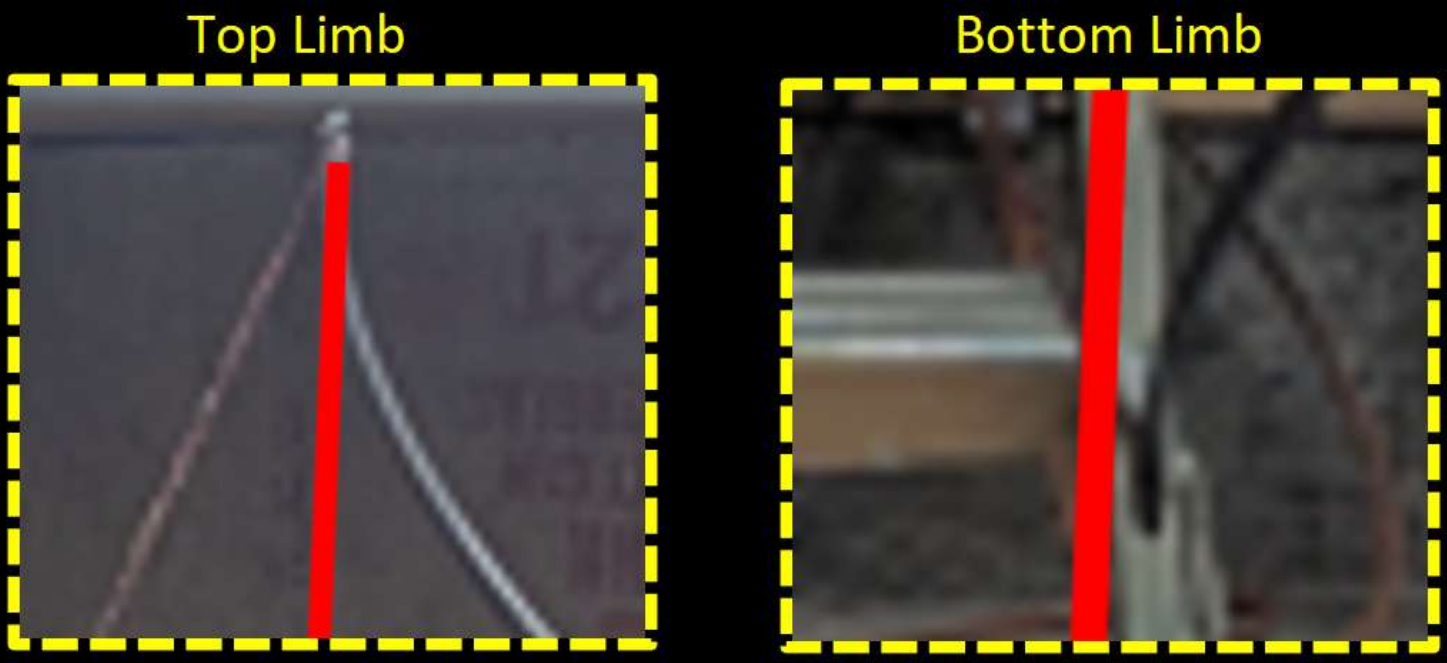
6. Copy and translate over to one tip



7. Then lengthen to next tip without changing the line angle, keeping them parallel



8. Then identify which limb is behaving weaker. Loosen the stronger limbs tiller bolt about a quarter turn.
    8.1. The image zoomed in image below shows bottom limb pulls slightly less than top limb. This would indicate top limb is slightly weak at full draw.



9. Adjust nock height back to initial measurement in step 3
10. Repeat steps 4 through 8 over and over again till limb tips flex back evenly
11. Repeat step 2
12. Repeat steps 3 through 12 until you feel you have reached your goal of full draw tiller and nock height optimization.
    12.1. Note: We recommend to do this cycle twice during initial set up of bow system and then periodically through out the bow systems life. If anything changes in the bow system or archers form then a repeat of these steps is recommended.

3.8 Advance Dynamic Limbs Closer Tiller Adjustment And Optimization

- TBD

4 ARROW SELECTION GUIDE

- The following arrow Charts are a good estimate on what arrow spine, length and tip weight you will need for our limbs at a bow weight at your draw.
  - Spine and arrow length charts do not replace the need for bare shaft tuning. We recommend to always bare shaft tune arrows and bow to get perfect arrow flight or slightly weak.
    - A slightly weak arrow flight response will yield closer to perfect after fletches are placed on back of arrow.

MOAC LIMBS ARROW SPINE DEFLECTION CHART (150gn. Total Tip Weight)								
Bow Weight at Draw Length (lbs.)	Arrow Length (Back of Insert or Footing)							
	25"	26"	27"	28"	29"	30"	31"	32"
20-25	900	850	800	750	700	650	600	550
25-30	850	800	750	700	650	600	550	500
30-35	800	750	700	650	600	550	500	450
35-40	750	700	650	600	550	500	450	400
40-45	700	650	600	550	500	450	400	350
45-50	650	600	550	500	450	400	350	300
50-55	600	550	500	450	400	350	300	250
55-60	550	500	450	400	350	300	250	
60-65	500	450	400	350	300	250		
65-70	450	400	350	300	250			

MOAC LIMBS ARROW SPINE DEFLECTION CHART (225gn. Total Tip Weight)								
Bow Weight at Draw Length (lbs.)	Arrow Length (Back of Insert or Footing)							
	25"	26"	27"	28"	29"	30"	31"	32"
20-25	800	750	700	650	600	550	500	450
25-30	750	700	650	600	550	500	450	400
30-35	700	650	600	550	500	450	400	350
35-40	650	600	550	500	450	400	350	300
40-45	600	550	500	450	400	350	300	250
45-50	550	500	450	400	350	300	250	
50-55	500	450	400	350	300	250		
55-60	450	400	350	300	250			
60-65	400	350	300	250				
65-70	350	300	250					

MOAC LIMBS ARROW SPINE DEFLECTION CHART (355gn. Total Tip Weight)								
Bow Weight at Draw Length (lbs.)	Arrow Length (Back of Insert or Footing)							
	25"	26"	27"	28"	29"	30"	31"	32"
20-25	700	650	600	550	500	450	400	350
25-30	650	600	550	500	450	400	350	300
30-35	600	550	500	450	400	350	300	250
35-40	550	500	450	400	350	300	250	
40-45	500	450	400	350	300	250		
45-50	450	400	350	300	250			
50-55	400	350	300	250				
55-60	350	300	250					
60-65	300	250						
65-70	250							

Chart 7 MOAC Limbs Arrow Spine Deflection Chart

TAC LIMBS ARROW SPINE DEFLECTION CHART (150gn. Total Tip Weight)								
Bow Weight at Draw Length (lbs.)	Arrow Length (Back of Insert or Footing)							
	25"	26"	27"	28"	29"	30"	31"	32"
20-25	850	800	750	700	650	600	550	500
25-30	800	750	700	650	600	550	500	450
30-35	750	700	650	600	550	500	450	400
35-40	700	650	600	550	500	450	400	350
40-45	650	600	550	500	450	400	350	300
45-50	600	550	500	450	400	350	300	250
50-55	550	500	450	400	350	300	250	
55-60	500	450	400	350	300	250		
60-65	450	400	350	300	250			
65-70	400	350	300	250				

TAC LIMBS ARROW SPINE DEFLECTION CHART (225gn. Total Tip Weight)								
Bow Weight at Draw Length (lbs.)	Arrow Length (Back of Insert or Footing)							
	25"	26"	27"	28"	29"	30"	31"	32"
20-25	750	700	650	600	550	500	450	400
25-30	700	650	600	550	500	450	400	350
30-35	650	600	550	500	450	400	350	300
35-40	600	550	500	450	400	350	300	250
40-45	550	500	450	400	350	300	250	
45-50	500	450	400	350	300	250		
50-55	450	400	350	300	250			
55-60	400	350	300	250				
60-65	350	300	250					
65-70	300	250						

TAC LIMBS ARROW SPINE DEFLECTION CHART (355gn. Total Tip Weight)								
Bow Weight at Draw Length (lbs.)	Arrow Length (Back of Insert or Footing)							
	25"	26"	27"	28"	29"	30"	31"	32"
20-25	750	700	650	600	550	500	450	400
25-30	700	650	600	550	500	450	400	350
30-35	650	600	550	500	450	400	350	300
35-40	600	550	500	450	400	350	300	250
40-45	550	500	450	400	350	300	250	
45-50	500	450	400	350	300	250		
50-55	450	400	350	300	250			
55-60	400	350	300	250				
60-65	350	300	250					
65-70	300	250						

Chart 8 TAC Limbs Arrow Spine Deflection Chart

CAC LIMBS ARROW SPINE DEFLECTION CHART (150gn. Total Tip Weight)								
Bow Weight at Draw Length (lbs.)	Arrow Length (Back of Insert or Footing)							
	25"	26"	27"	28"	29"	30"	31"	32"
20-25	800	750	700	650	600	550	500	450
25-30	750	700	650	600	550	500	450	400
30-35	700	650	600	550	500	450	400	350
35-40	650	600	550	500	450	400	350	300
40-45	600	550	500	450	400	350	300	250
45-50	550	500	450	400	350	300	250	
50-55	500	450	400	350	300	250		
55-60	450	400	350	300	250			
60-65	400	350	300	250				
65-70	350	300	250					

CAC LIMBS ARROW SPINE DEFLECTION CHART (225gn. Total Tip Weight)								
Bow Weight at Draw Length (lbs.)	Arrow Length (Back of Insert or Footing)							
	25"	26"	27"	28"	29"	30"	31"	32"
20-25	800	750	700	650	600	550	500	450
25-30	750	700	650	600	550	500	450	400
30-35	700	650	600	550	500	450	400	350
35-40	650	600	550	500	450	400	350	300
40-45	600	550	500	450	400	350	300	250
45-50	550	500	450	400	350	300	250	
50-55	500	450	400	350	300	250		
55-60	450	400	350	300	250			
60-65	400	350	300	250				
65-70	350	300	250					

CAC LIMBS ARROW SPINE DEFLECTION CHART (355gn. Total Tip Weight)								
Bow Weight at Draw Length (lbs.)	Arrow Length (Back of Insert or Footing)							
	25"	26"	27"	28"	29"	30"	31"	32"
20-25	750	700	650	600	550	500	450	400
25-30	700	650	600	550	500	450	400	350
30-35	650	600	550	500	450	400	350	300
35-40	600	550	500	450	400	350	300	250
40-45	550	500	450	400	350	300	250	
45-50	500	450	400	350	300	250		
50-55	450	400	350	300	250			
55-60	400	350	300	250				
60-65	350	300	250					
65-70	300	250						

Chart 9 CAC Limbs Arrow Spine Deflection Chart

TAL LIMBS ARROW SPINE DEFLECTION CHART (150gn. Total Tip Weight)								
Bow Weight at Draw Length (lbs.)	Arrow Length (Back of Insert or Footing)							
	25"	26"	27"	28"	29"	30"	31"	32"
20-25	750	700	650	600	550	500	450	400
25-30	700	650	600	550	500	450	400	350
30-35	650	600	550	500	450	400	350	300
35-40	600	550	500	450	400	350	300	250
40-45	550	500	450	400	350	300	250	
45-50	500	450	400	350	300	250		
50-55	450	400	350	300	250			
55-60	400	350	300	250				
60-65	350	300	250					
65-70	300	250						

TAL LIMBS ARROW SPINE DEFLECTION CHART (225gn. Total Tip Weight)								
Bow Weight at Draw Length (lbs.)	Arrow Length (Back of Insert or Footing)							
	25"	26"	27"	28"	29"	30"	31"	32"
20-25	750	700	650	600	550	500	450	400
25-30	700	650	600	550	500	450	400	350
30-35	650	600	550	500	450	400	350	300
35-40	600	550	500	450	400	350	300	250
40-45	550	500	450	400	350	300	250	
45-50	500	450	400	350	300	250		
50-55	450	400	350	300	250			
55-60	400	350	300	250				
60-65	350	300	250					
65-70	300	250						

TAL LIMBS ARROW SPINE DEFLECTION CHART (355gn. Total Tip Weight)								
Bow Weight at Draw Length (lbs.)	Arrow Length (Back of Insert or Footing)							
	25"	26"	27"	28"	29"	30"	31"	32"
20-25	700	650	600	550	500	450	400	350
25-30	650	600	550	500	450	400	350	300
30-35	600	550	500	450	400	350	300	250
35-40	550	500	450	400	350	300	250	
40-45	500	450	400	350	300	250		
45-50	450	400	350	300	250			
50-55	400	350	300	250				
55-60	350	300	250					
60-65	300	250						
65-70	250							

Chart 10 TAL Limbs Arrow Spine Deflection Chart

5 DEFINITIONS AND TERMINOLOGY

1) ***Bow System:*** This is the complete bow; riser, limbs and string.
2) ***Dry Fire:*** Drawing bow back further than 6inches and releasing string without an arrow attached.
3) ***String Contact Length (SCL):*** This is the string length from the tip of limbs to the location the string comes off the belly side of limbs. This is our standard of making sure the bow system is always braced correctly.
4) ***Brace:*** Distance from the bow string to the belly/inside throat of the grip.
5) ***Belly String Grooves:*** String grooves that help maintain proper aesthetics of limb alignment
6) ***Tiller:*** Tiller is how the bow limbs flex
7) ***Built-In Tiller:*** Tiller that is designed into the limbs and riser. For the limbs this could be intentional, limb tolerance and/or limb defect. For the riser this could be either limb angle tolerance and/or riser defect.
8) ***Static Tiller:*** This is the tiller at brace with no draw force applied on string.
9) ***Dynamic Tiller:*** This is the tiller as draw force is applied to string and limbs are flex back.
10) ***Riser Deflex:*** How far forward the grip sits relative to the limbs.
11) ***Power Stroke:*** This is the distance the string travels from brace.
12) ***Modified Draw Length:*** This length incorporates the risers deflex and how it affects the power stroke and amount the limbs are flexing at full draw.
13) ***Belly of Bow:*** With bow extended out from body, holding it as archer was to shoot, this is the side that is facing the archer
14) ***Back of Bow:*** With bow extended out from body, holding it as archer was to shoot, this is the side that is facing the target
15) ***AMO Proper String Length:*** 3 inches longer than actual string length measured under 100# of tension
16) ***Bow Stringer:*** Apparatus to properly string up bow. Attaches to both limbs and safely flexes them back enough to install string
17) ***Positive Tiller:*** Upper limb has a longer distance from limb butt to string than lower limb.
18) ***Negative Tiller:*** Lower limb has a longer distance from limb butt to string than upper limb.
19) ***3 Under Style Shooter:*** Three fingers (index, middle and ring) all touching each other and index touching arrow nock.
20) ***Split Style Shooter:*** Three fingers (index, middle and ring) with index and middle finger touching arrow nock with middle and ring touching each other.
21) ***Fixed Crawl Style Shooter***: 3 under style shooter who has their three fingers placed somewhere below the arrow nock (not touching) to achieve an arrow tip point on aiming for a certain distance
22) ***String Walking:*** 3 under style shooter who moves their 3 fingers together up and down the string to achieve an arrow tip point on aiming at multiple distances.
23) ***Riser Rocking:*** The event of an out of dynamic tiller bow system where the riser rocks forwards, back or forward and back.
24) ***Tiller Sensitivity:*** This is a measurement of how forgiving a bow system is on dynamic tiller. A highly tiller sensitive is not forgiving for variations of grip pressure and finger pressure.
25) ***Torsional Rigidity:*** This is a measurement of how much the bow is resistant to a twisting force.
26) ***Lateral Rigidity:*** This is a measurement of how much the bow is resistant to a lateral force.

6 REFERENCES

1) Archery Trade Association Technical Guidelines, First Edition, 2009