



# SUPER TUNING ARROWS

*Our spine tester design uses spring pressure versus dead weight.*

*We have found it makes locating and measuring the spine much easier if you can adjust the pressure exerted on the shaft from one to four pounds and greater yet for crossbow bolts.*

*Consistency is what we are looking for!*

# Why Spine Matters

Throughout a shot cycle, an immense amount of energy is placed into the bow at full draw. This energy is then transferred into the arrow upon release.

This rapid transfer of dynamic force causes the arrow to flex and oscillate. If too much flex occurs in the shaft, then the arrow will have a hard time recovering and flying straight.

Conversely, if the arrow doesn't flex enough, then it could fail to properly clear the bow and won't be as forgiving as it flies down range.

The most accurate arrow will be the one with the proper balance of flex and forgiveness as it leaves the bow, and necessary stiffness to recover and stabilize as it begins to head downrange.

## Understanding arrow stiffness

The spine, or “stiffness”, of an arrow is a simple concept to understand, yet its importance is often overlooked. To understand what arrows you should be shooting out of your bow, you need to understand what arrow spine is, how it is calculated, and why finding the “right arrow” – or at least the best one – takes some forethought.

Arrow spine is evaluated by “deflection”, which is a measurement of the shaft’s propensity to bending when force is applied.

The traditional way spine ratings are determined is by taking an arrow shaft at a length of 28”, supporting it at both ends, and hanging a 1.94lb. weight at the center. The amount of flex that is induced on the arrow shaft by the force of the weight is then measured and gives us our “static” spine rating. For example, if an arrow bends one half of an inch at the center, then the shaft has a static spine deflection of .500”.

Because this numerical deflection is a representation of a physical measurement – that is the arrow’s resistance towards a static force – a stiffer shaft will have a lower

deflection number (less bend), and a weaker shaft will have a higher deflection number (more bend).

The most common deflections for hunting arrows are from 500 on the “weaker” end, to 300 on the stiffer end, with increments in between. (It is worth noting that some manufacturers use their own numerical systems, so be sure to check and see how the manufacturer’s classifications compare to the actual shaft deflection rating.

With all modern arrows, it’s not necessary to measure the spine to find out what its rating is, as the manufacturers have already done this for us . Rather we are looking to get shafts that are as close to identical as possible.

This is very important when shooting broadheads!

# Spine-Tester Pro

For more info see

[www.coopsbowsmith.com](http://www.coopsbowsmith.com)

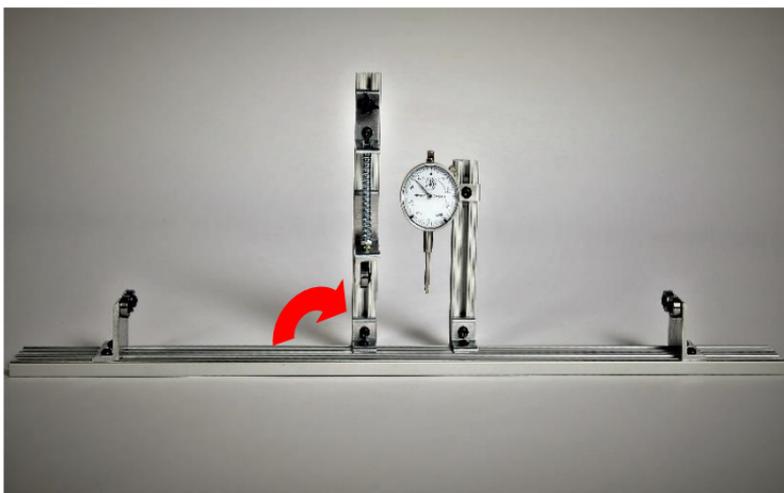




**This is how your spine tester arrives.**

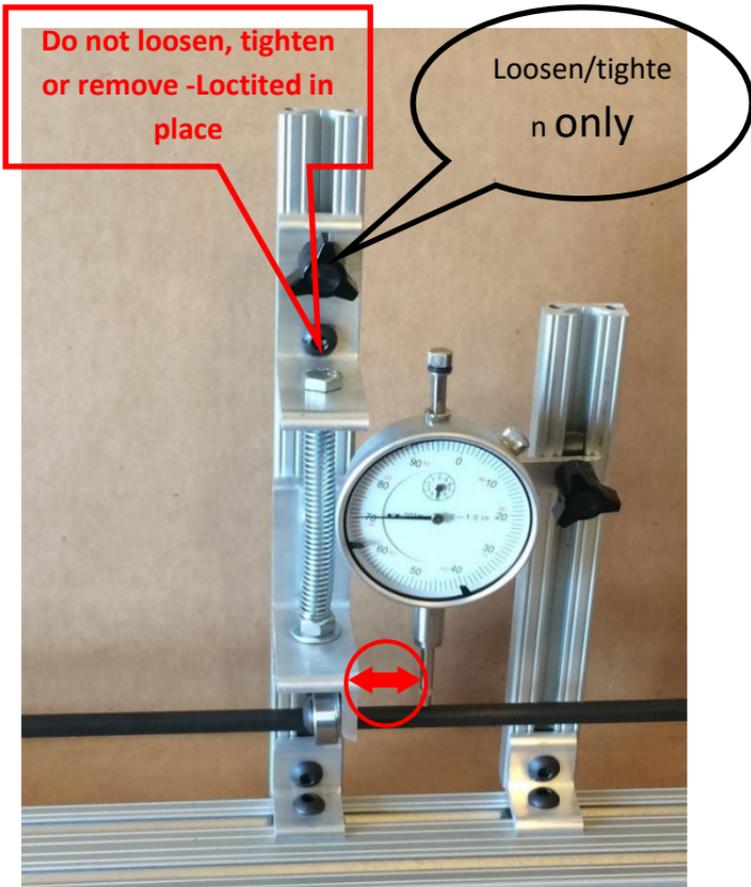


**To assemble un-package and install  
the dial indicator**

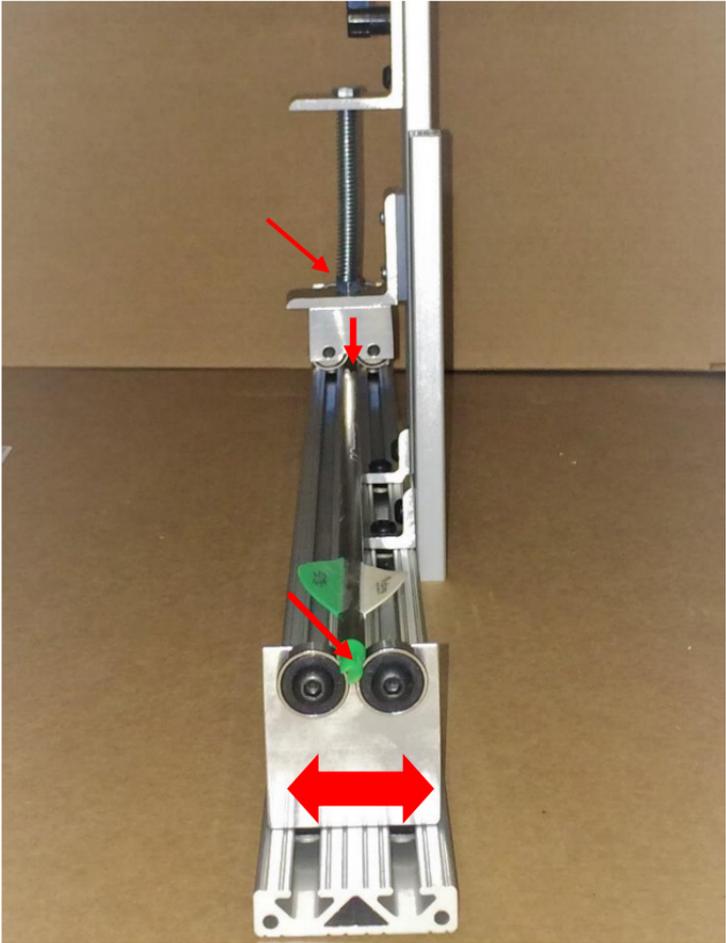


**Loosen the  $\frac{1}{4}$ -20 screw and position  
*as shown in the picture***

***To measure or locate the spine, Start by  
raising the sliding block by loosening the  
knob and retighten it so it is out of the  
way. Now place your arrow between the  
two outer rollers.***



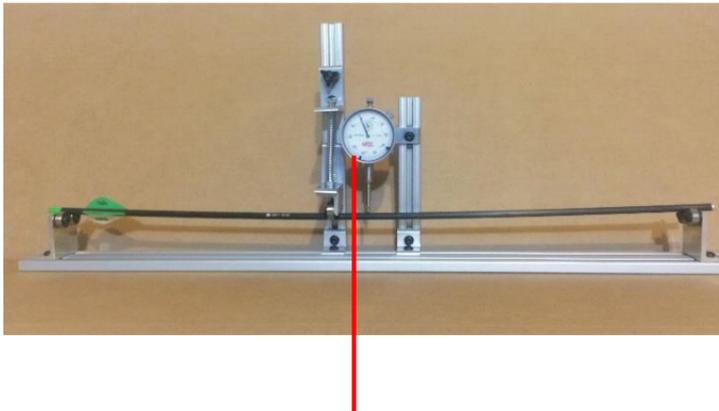
**NOTE: keep the dial gauge close to the pressure point. Testing has shown no measurable distance in deflection when kept to a minimum.**



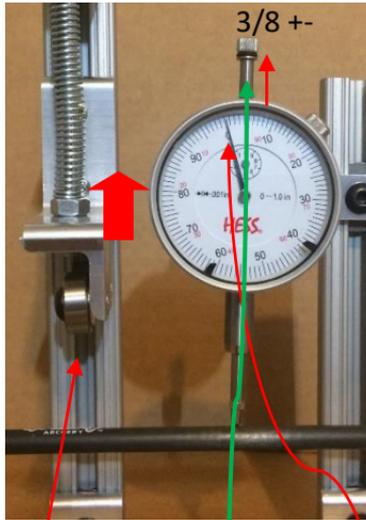
**Adjust the end bearings until the center press lines up on the center of the shaft**

**The first thing we want to do is to check all the shafts for spine consistency. I like to have my shafts as close to perfect as possible but a deflection of .010 is acceptable.**

**Adjust the outer bearing blocks to fit your shaft**



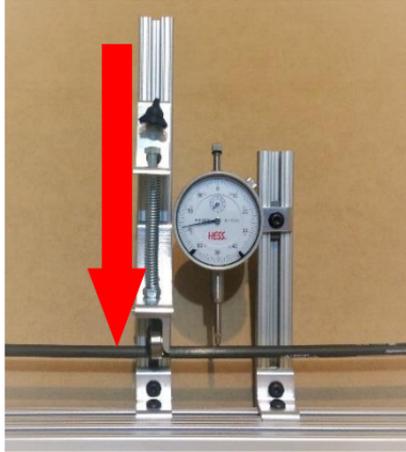
**Center of the shaft should be centered between the dial gauge and the spring loaded rollers**



*With the **rollers** positioned up and out of the way position the dial indicator against the shaft so as to have an adequate **amount of movement**.*

*Rotate the dial face to align the **"0"** to the dial pointer.*

**Loosen the slide and push the rollers down against the shaft**



***Apply enough downward pressure to rotate the pointer 2 to 3 times and lock in place and rotate dial face so 0 is once again centered on the pointer.***

***(.25-.30 deflection is adequate )***



**with the next shaft to be checked.**

**Now gently allow probe to rest  
against the shaft.**

**Keep a written log of your shafts as  
you go.**

**Depending on the quality of the  
shafts you need to decide how tight  
your tolerances should be.**

**High-quality shafts I expect to be  
within 005.**

**It's important to check your shafts  
periodically throughout their life.**

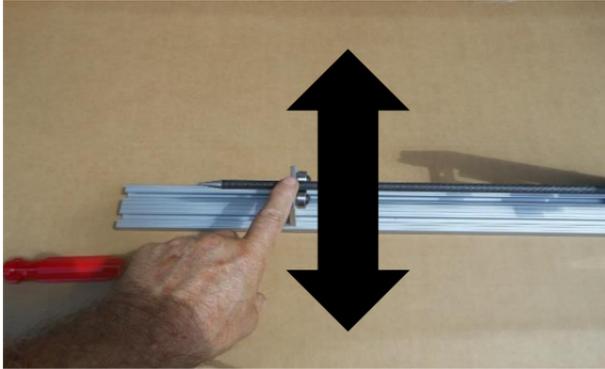
**Well, used shafts may soften or in the  
case of aluminum become work  
hardened over time and need to be  
disposed of.**

## ***Locating the spine***

***Use caution with aluminum or carbon over aluminum so as not to bend.***

***Experiment with old shafts if necessary.***

***With your spine tester set up the same way, we did for testing for deflection. Roll the arrow using your finger to get a feel for the shaft and watch the dial.***

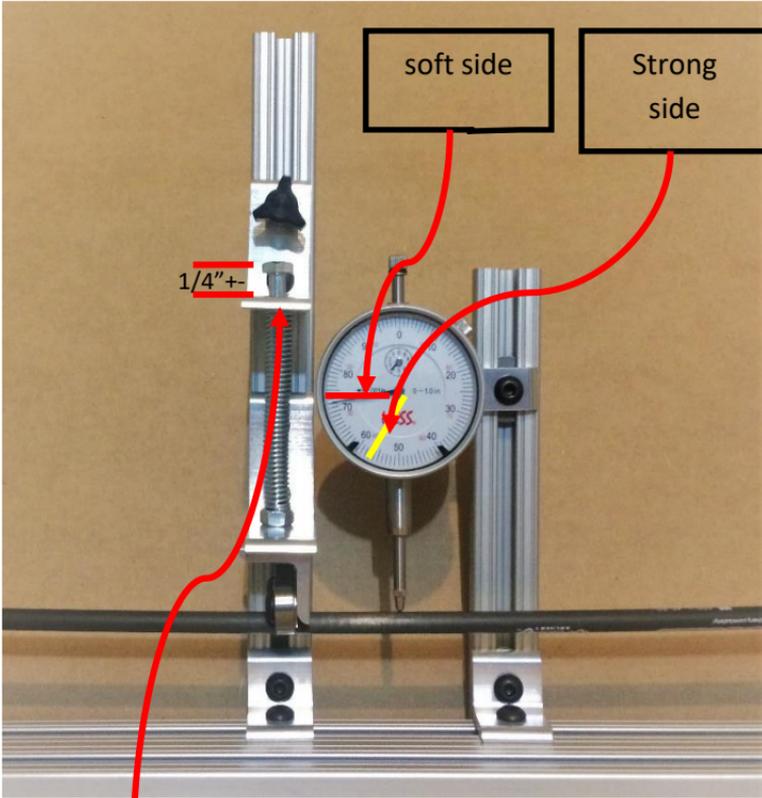


***You will feel the arrow fall into a valley and the dial will indicate a sharp rise this is the spine or the soft side of the shaft.***

***With practice, you can do this by feel alone.***

***NOTE; It may be easier to find the spine by applying more pressure to the shaft.***

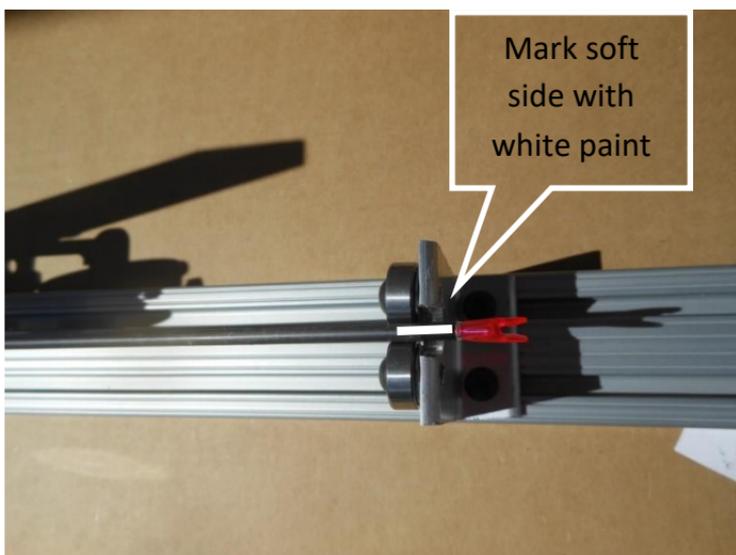
***Very stiff crossbow bolts may require a lot of pressure to locate the spine.***



***By compressing the spring against the shaft by a ¼ inch will give you 1.94 +/- pounds standard pressure.***

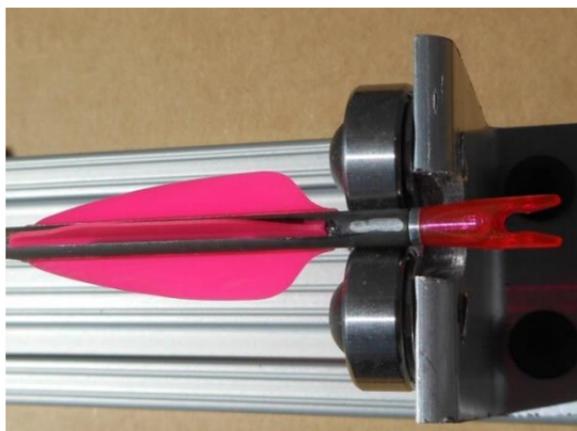
***NOTE: not necessary to compress to exactly 1.94 pounds. 1 to 3 pounds works fine for this. We already know what the shafts rating are. We are looking for consistency!***

**Mark the soft side. This way when the bow is fired the arrow will flex up away from the rest.**



***I recommend using the same color***

***fletching this makes nock tuning easier if necessary. Also, use the basic tri fletch pattern I have found this to be the best through extensive machine testing.***



**Fletch and finish your shafts and weigh.  
Weigh each point and adjust until perfect.  
Be sure and weigh your completed arrows.**

**Get them perfect!**

.

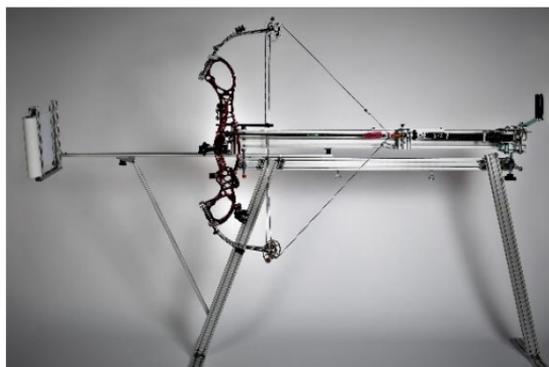
**Make sure your nocks fit the string properly.**

**Too tight and they will pluck, giving you a shotgun effect most noticeable at longer ranges.**

**Too loose and they risk falling off!**

***Your arrows are now ready to use or you may want to move on to the next phase of advanced tuning and shoot them through a machine to group tune. All shafts are not the same the cheaper shafts benefit the most from machine tuning. I shoot Carbon Express Nano Pros for field and have found that group tuning at 80 yards works best after the shafts have been SPINED. I nock tune or cull any flyers and I'm good to go.***

# ***Bowsmith pro***



***All shooters can benefit from our Bowsmith Pro. Know for sure your equipment is working at its peak performance.***

***Before a major field tournament, I do a quick check at 20 and 80 using my shooting machine to verify my bow and arrows are working together as best as possible. Any bad shots after that are attributed to my poor form.***

# ***.Checking for straightness***



***Use the dial pressure only to check for  
straightness.***



# Tuning broad- heads

*To tune broad-heads and check pin  
nocks tape a piece of paper to the  
aluminum block that holds the spring  
loaded rollers.*



***Mark a spot with your point and rotate and watch for drift.***

***If your point wobbles around center, remount or tweak until perfect.***



***Flip the shaft around and do the same thing to check pin –nock.***

OWNER \_\_\_\_\_

MAKE AND MODEL \_\_\_\_\_

FACTORY SETTINGS

ACTUAL BEFORE TUNE

AXEL TO AXEL \_\_\_\_\_

BRACE HEIGHT \_\_\_\_\_

DRAW LENGTH \_\_\_\_\_

DRAW WEIGHT \_\_\_\_\_

LIMB BOLT SETTING \_\_\_\_\_

PEEP HEIGHT \_\_\_\_\_

SIGHT RADIUS \_\_\_\_\_

---

TUNED SETTINGS

AXEL TO AXEL \_\_\_\_\_

BRACE HEIGHT \_\_\_\_\_

DRAW LENGTH \_\_\_\_\_ D- LOOP \_\_\_\_\_

DRAW WEIGHT \_\_\_\_\_

LIMB BOLT -TOP \_\_\_\_\_ BOTTOM \_\_\_\_\_

PEEP HEIGHT \_\_\_\_\_

SIGHT RADIUS \_\_\_\_\_

TILLER + - BOLT TURN TOP \_\_\_\_\_ BOTTOM \_\_\_\_\_