



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 broad heads!

Spine-Tester Pro

For more info see

www.coopsbowsmith.com

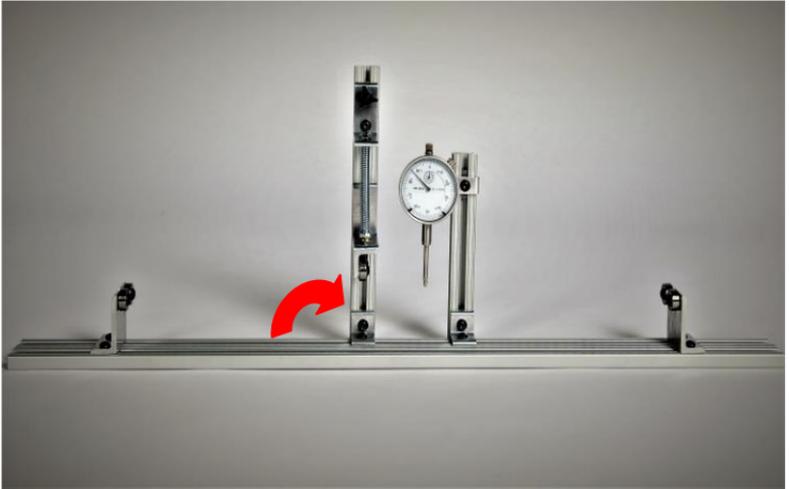




This is how your spine tester arrives.

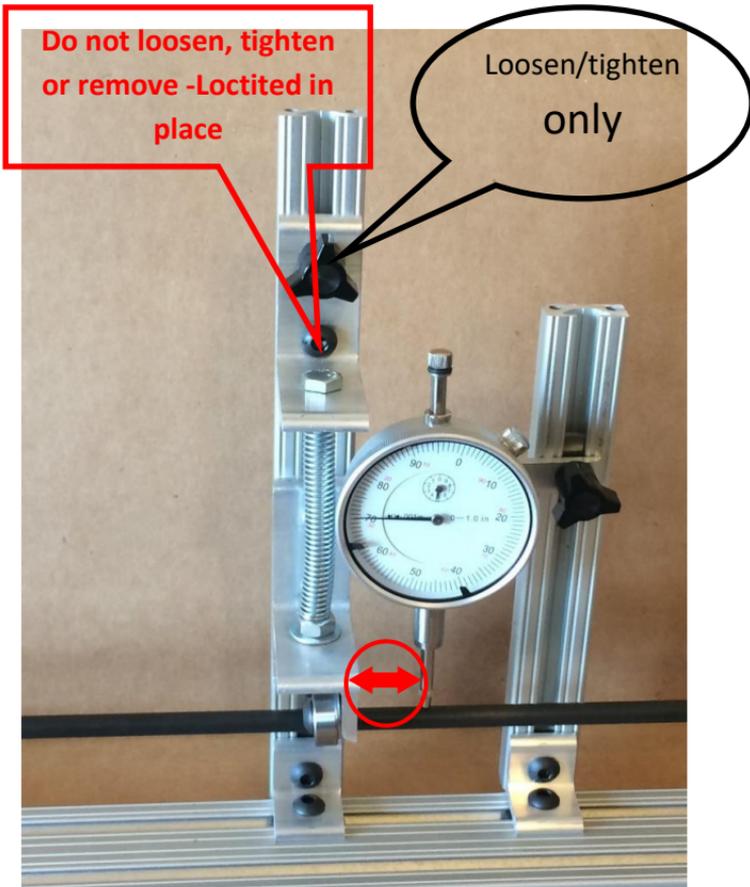


**To assemble un-package and install
dial indicator**

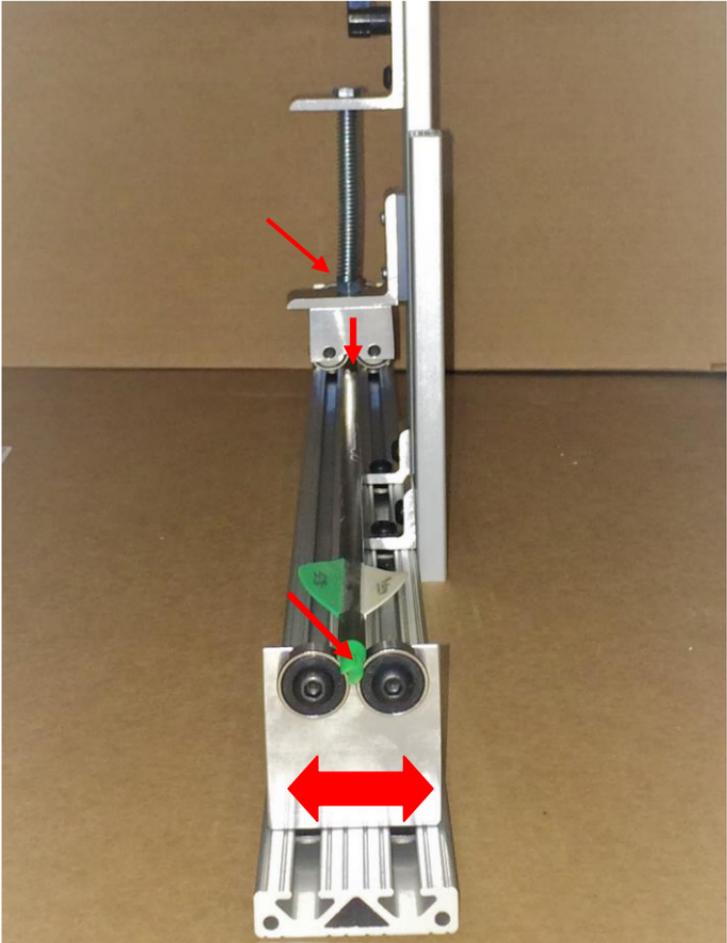


**Loosen the $\frac{1}{4}$ -20 screw and position
*as shown in picture***

***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.***



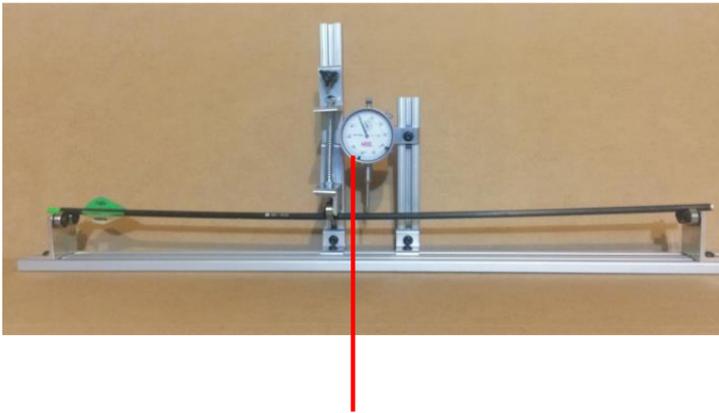
NOTE: keep the dial gauge close to the pressure point. Testing has shown no measurable distance in deflection when kept to a minimum.



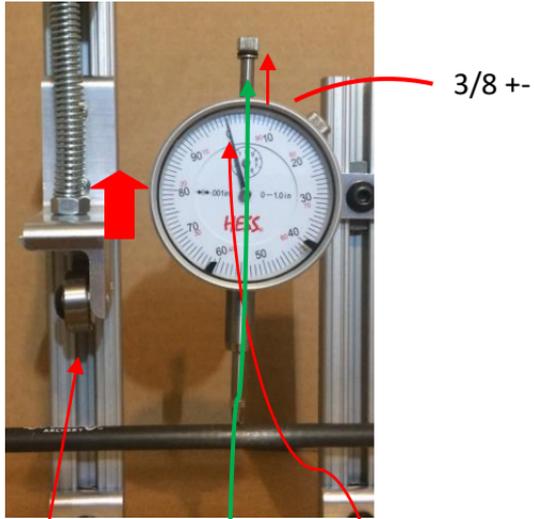
Adjust the end bearings until the center press lines up on the center of the shaft

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



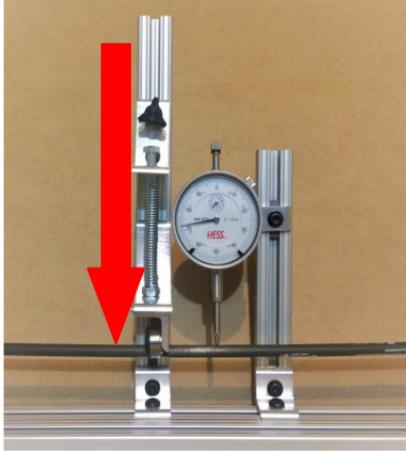
Center of the shaft should be centered between the dial gauge and the spring loaded rollers



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.

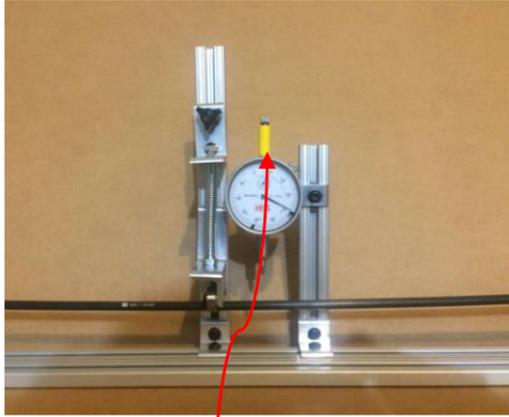
Loosen the slide and push the rollers down against the shaft



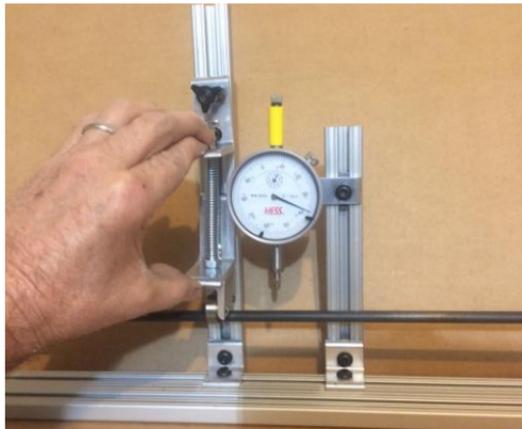
Apply enough downward pressure to rotate the pointer 2 to 3 times and lock in place and rotate dial face so 0 is once again centered on pointer.

(.25-.30 deflection is adequate)





Lift the probe that rests on the shaft and clip on the yellow plastic retainer.



To change shafts just squeeze the two prongs together and hold while you remove one shaft and replace.

**with the next shaft to be checked.
Now gently remove yellow sleeve
and 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.**

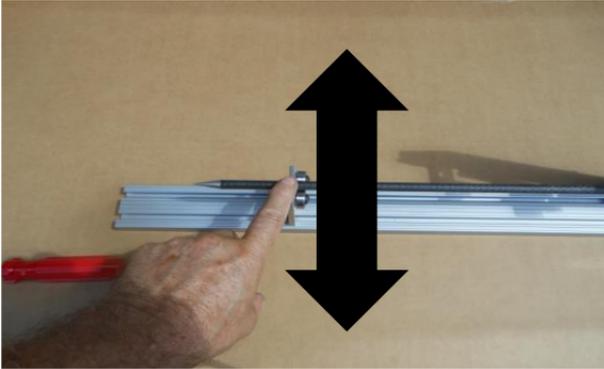
**Well used shafts may soften or in the
case of aluminum become work
hardened over time and need to be
disposed of.**

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.

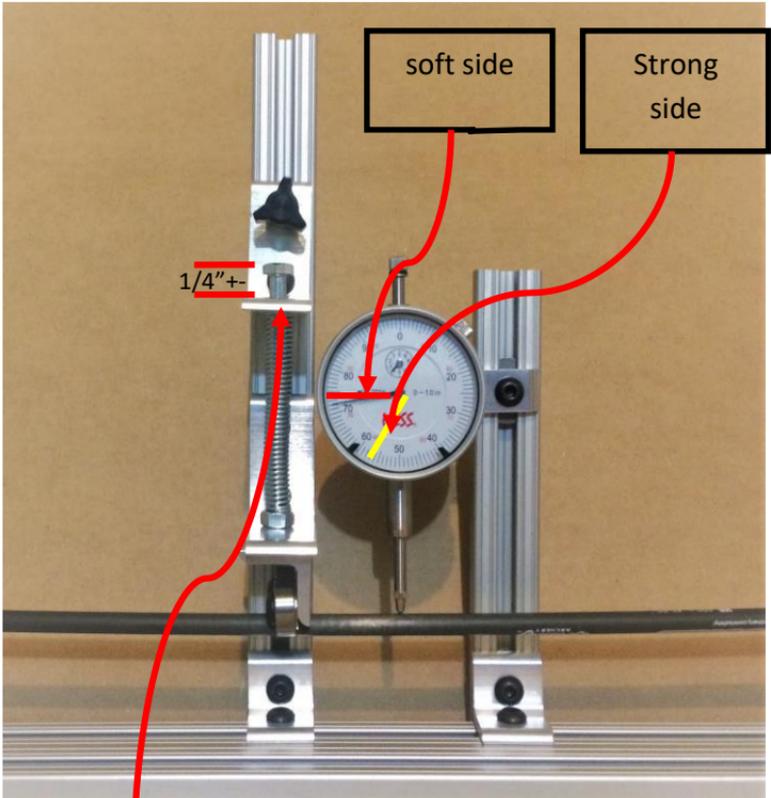


You will feel the arrow fall into a valley and the dial will indicate a sharp rise this is the spine or the soft side of the shaft.

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.

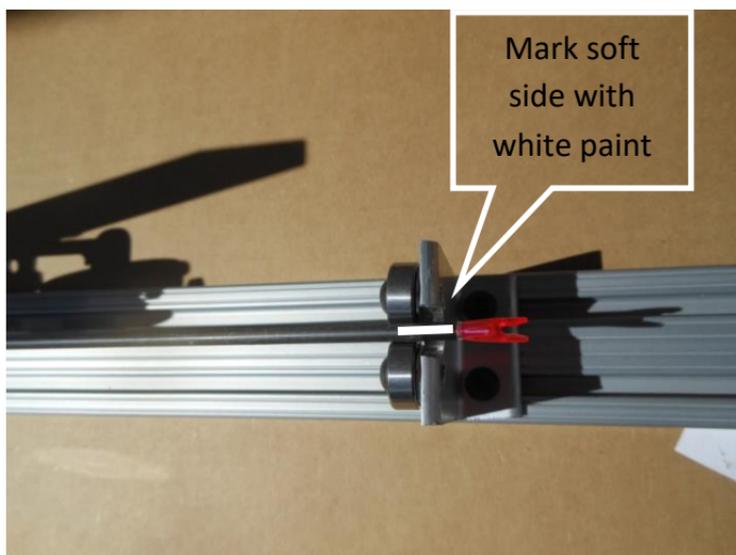
Very stiff crossbow bolts may require a lot of pressure to locate the spine.



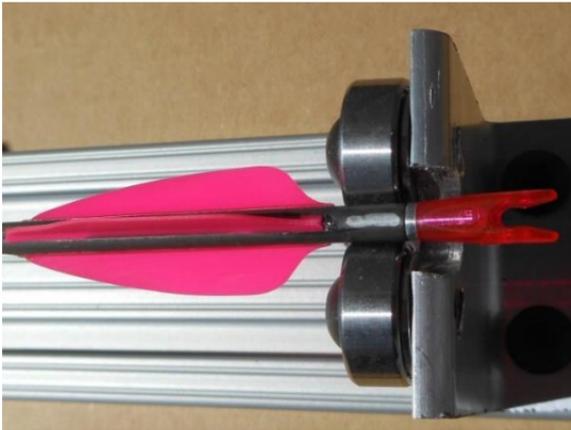
By compressing the spring against the shaft by $\frac{1}{4}$ inch will give you 1.94 +/- pounds standard pressure.

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!

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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

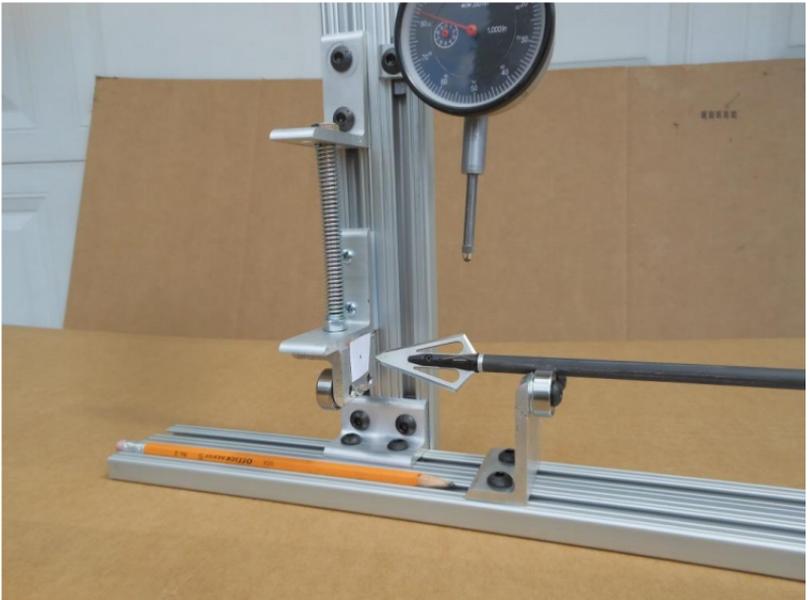


***Use the dial pressure only to check for
straightness.***



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.