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 if 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 arrows 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.

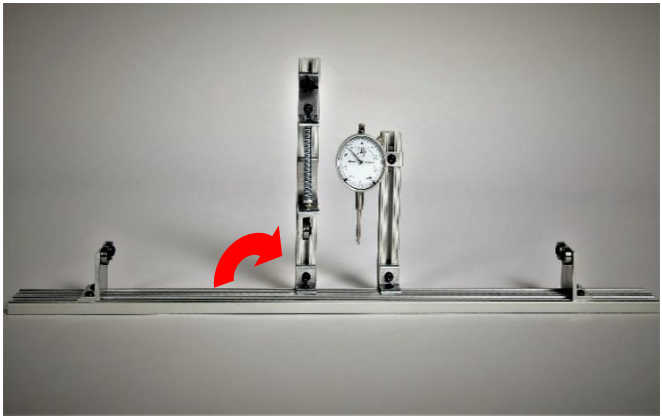
With all modern arrows, it's not necessary to measure the spine to find out what its rating is, as the manufacturers have already done this for us . Rather we are looking to get shafts that are as close to identical as possible. This is very important when shooting broadheads!

Spine-Tester Pro

For more info see

www.coopsbowsmith.com

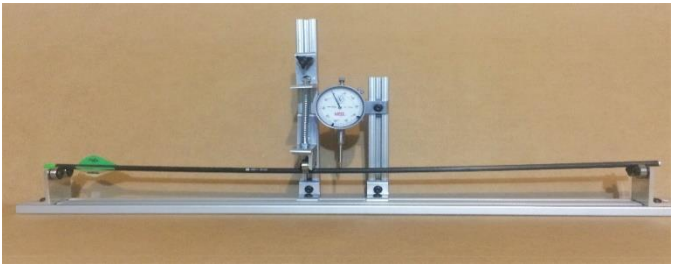
This is how your spine tester arives. Install the dial gauge as seen in pics and raise tower in place.



Loosen the ¼-20 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.

Adjust the outer bearing blocks to fit your shaft maintain the greatest distance as the shaft will allow



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

Locating the spine

Use caution with aluminum or carbon over aluminum so as not to bend. Experiment with old shafts if necessary.

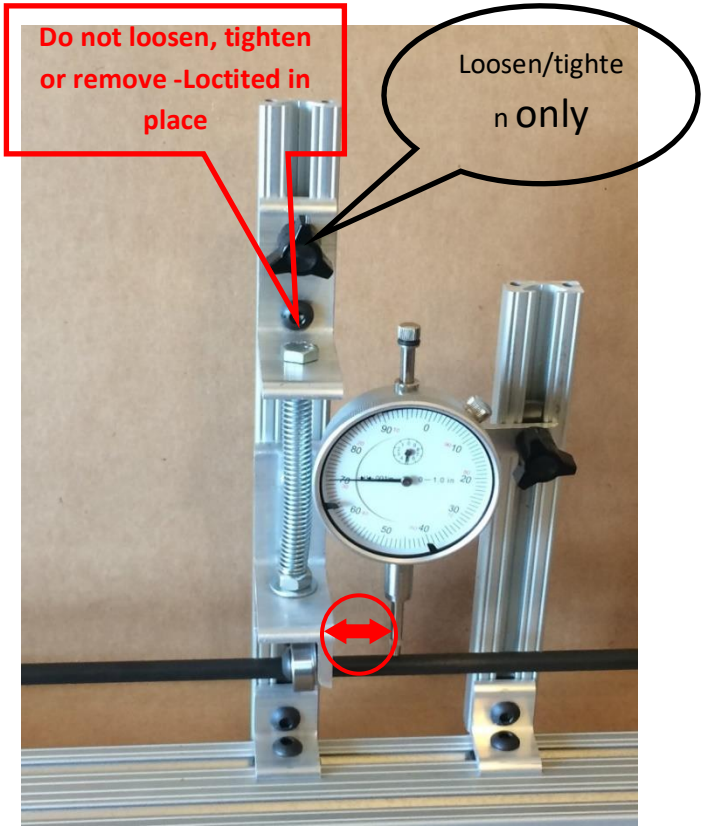
With your spine tester set up the same way, we did for testing for deflection. Roll the arrow using your finger to get a feel for the shaft.

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

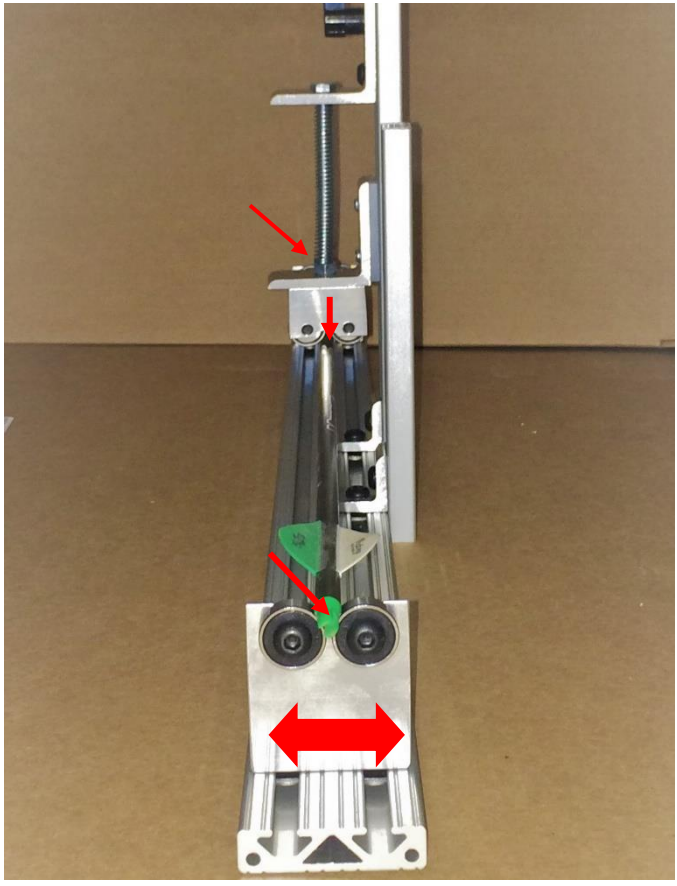
With practice, you can do this by feel alone.

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.



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

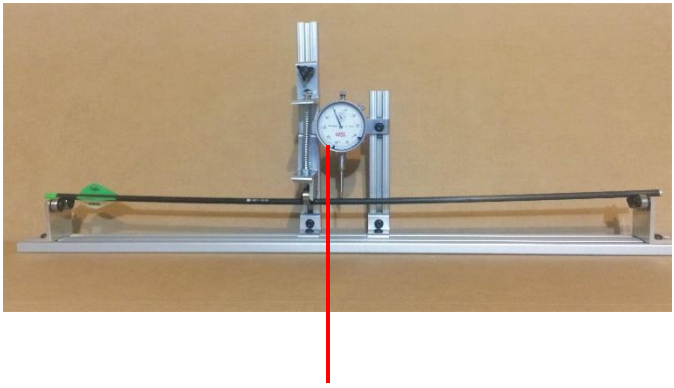


Adjust the end bearings until the center press lines up on the center of

the shaft

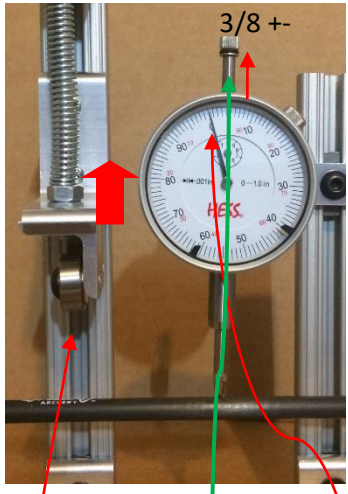
The first thing we want to do is to check all the shafts for spine consistency. I like to have my shafts as close to perfect as possible but a deflection of .010 is acceptable.

Adjust the outer bearing blocks to fit your shaft



Center of the shaft should be

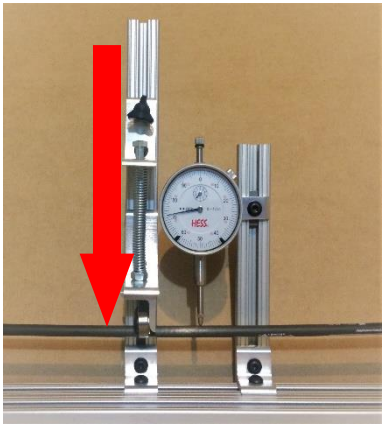
centered between the dial gauge and the spring loaded rollers



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.

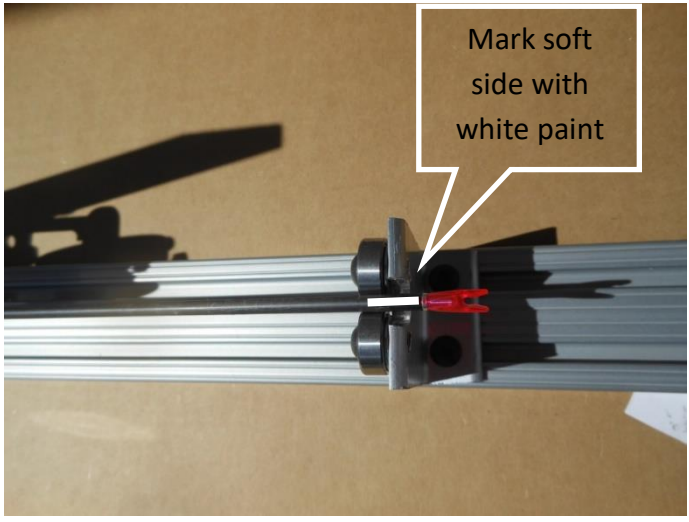
Depending on the quality of the shafts you need to decide how tight your tolerances should be.

High-quality shafts I expect to be within 005.

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

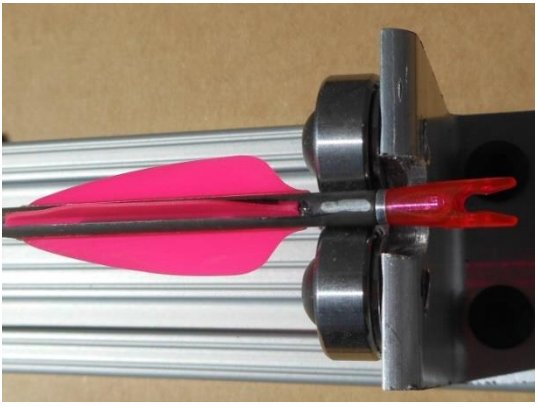
Well, used shafts may soften or in the case of aluminum become work hardened over time and need to be disposed of.

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.

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 _____