THE HOPEWELL METHOD OF BARREL TUNING

Comments by Guy Starik"

The tuner is a weight which can be precisely position by minute steps, allowing you to find the “Sweet Spot” of the tuner, by precisely adjusting the position of the tuning weight, until the barrel oscillations, create “positive compensation” this greatly improving the accuracy with ammo of higher or lower velocity. This avoids vertical groups on the target.

Being able to “tune the barrel” is an art long since studied by long distance bench rest shooters, but largely ignored by many Olympic Rimfire competitors. This is a shame, as the tuning can make a real and meaningful improvement to your rifle’s accuracy!

As a bullet speeds through the barrel it creates a whipping effect in the barrel, much like a Sinus wave form. This is minute of course, but it does mean that a faster and a lower bullet will launch from the crown of the barrel at a slightly different angle within that sinus wave form. This leads to a vertical displacement on the target. Bearing in mind that even with good ammo, the variance in speed can be as much as 30 fps – this is a big deal! Usually, the faster bullet will hit

higher on the target, and a variance of 30 fps will translate to about 5mm height difference on a 50m target. This is too much! Way too much!

In order to compensate for the variation in velocity, we need to verify that both slow and fast bullets will exit the barrel on the upper slope of the cycle, so that slower rounds, which stay longer in the barrel, will exit it on a higher angle than faster rounds, thus compensating for the difference in velocities, and avoiding vertical dispersion. This is called “positive compensation”.

There are many tuners on the market - most in the $300CAN range (Harrell's, Starik, Ezell etc.).

Preliminary Tuning:

Don't worry about cross wind effects at this point as you are trying to tune the rifle to shoot with the least vertical stringing. It is best to do the testing in calm wind and definitely not in a head or tail wind.

Use the ammunition you plan on using in a match (measured and sorted). You cannot tune the rifle with one type of ammo (hi-velocity hunting) and expect good performance with another type (match grade target).

1. Set your tuner to "0" and fire two shots.
Turn tuner one complete revolution (25 clicks) and fire two shots at the same Point of Aim. Continue this until you reach "100". You now have a 10 shot group, all shot at the same POA.
2. Repeat step one from "100" to "200"
3. Repeat Step one from "200" to "300".
4. Repeat Step one from "300" to "400"
5. Repeat Step one from "400" to "500".
You now have five 10-shot groups.
If you notice the groups opening up vertically, finish the step you're on and move on to Intermediate Tuning.
One of the 10-shot groups will show the smallest vertical stringing.
You should have used only 50 rounds so far (or less).

Example: The "200" to "300" group shows the least vertical stringing.

Intermediate Tuning

6. Starting at "200", shoot 2 five-shot groups.
Shift to a different POA for each group.
7. Repeat at "225", "250", "275" and "300"
One of these settings will show the best average vertical group size.
You have used 100 (or less) rounds so far.

Example: Setting "250" showed the smallest average vertical group size.

Intermediate Tuning Part 2

8. Now, start at "240" and shoot a five shot group at "240", "245", "250", "255", "260".
One of these groups will show the least vertical stringing.
You have used 125 rounds (or less) so far.

Example: The "260" group shows the smallest vertical group.
In this example, shoot a 5 shot group at "265" to confirm that "260" is indeed the smallest vertically. OK - so you've confirmed that it is - go on to the next step.

Fine Tuning

9. Now, start at "257" and shoot a five shot group at "257", "259", "261" and "263"
One of these groups will show the least vertical stringing and is the "sweet" spot of your rifle barrel.
You have used a maximum of 145 rounds, (shorter versions are available on line).
If you have any doubts, start over at Step #6, and redo the testing.