



Seating Depth Explained

SEATING DEPT EXPLAINED Seating Depth Tuning — How Small Groups Are Actually Found

Big Picture First (anchor this mentally)

Powder charge controls barrel timing

Seating depth controls bullet alignment and release

Once your charge is stable (ladder + OCW done), seating depth is what collapses dispersion into a tight cluster.

If you tune seating depth first, you're tuning on shifting ground.

If you tune it last, it works like magic.

Why Seating Depth Matters (the physics)

When a bullet is fired, three critical things happen before it leaves the barrel:

Bullet jump (distance to lands)

Neck tension release

Engraving into rifling

Seating depth directly affects all three.

Small changes = big effects because:

The bullet is transitioning from static → moving → engraved

Any yaw or misalignment here gets locked in

The barrel cannot fix bad entry — only amplify it

The Two Seating Depth Philosophies

1■■ Jump tuning (most modern precision rifles)

Bullet jumps to lands

Very forgiving

Best for mags / temperature stability

2■■ Jam tuning (benchrest / single-feed)

Bullet touches or jams into lands

Extremely sensitive

Very narrow sweet spot

We'll focus on jump tuning, because it's practical and repeatable.

Step 1: Measure the Lands (accurately)

You must know where the lands are for that bullet.

Methods:

OAL gauge (Hornady style)

Modified case

Comparator (not COAL to tip)

■■ Important:



Measure base-to-ogive, not tip

Lands vary by bullet shape

Record:

Base-to-ogive touching lands. This is your zero reference.

Step 2: Choose a Safe Starting Jump

Never start at the lands unless you know the system.

Typical starting jumps:

0.020"-.0.030"-.0.040"

If unknown: ■ Start at 0.040" off

This avoids:

Pressure spikes

Hard bolt lift

False accuracy due to pressure

Step 3: How Seating Depth Affects Groups

Too close to lands:

Pressure spikes

Vertical stringing

Random flyers

Inconsistent release

Too far from lands:

Bullet enters rifling crooked

Horizontal spread

Larger but "round" groups

Sweet spot:

Clean release

Minimal yaw

Barrel timing + bullet alignment line up

That's where groups shrink.

Step 4: Designing the Seating Depth Test (properly)

Rules:

One powder charge only (OCW winner)

Same brass lot

Same neck tension

Same primer

Same conditions if possible

Increment size:

- 0.005" for sensitive bullets

- 0.010" for most



- 0.020" if you're far off lands

Example Test Plan:

Let's say lands = 2.150" BTO

Test: 2.110 (0.040 off)..2.120 (0.030 off)..2.130 (0.020 off)..2.140 (0.010 off)

Shoot:

3–5 shots per depth

Separate targets preferred

Step 5: How to Read Seating Depth Results (this is critical)

Now — unlike ladder or OCW — group size matters.

Look for:

One depth that is clearly tighter

Reduced vertical AND horizontal

Fewer unexplained flyers

What you'll often see:

Groups get worse → worse → suddenly tiny → worse again

That tiny one is not random. That's the alignment window.

Step 6: Understand Seating Depth "Nodes"

Just like powder, seating depth has nodes.

These are:

Ranges where bullet entry is consistent. Not always a single number

Example:

0.030 = 0.6 MOA

0.025 = 0.35 MOA

0.020 = 0.32 MOA

0.015 = 0.65 MOA

■ Node = 0.020–0.025

Pick the middle, not the extreme.

Why?

Throat erosion

Minor seating variation

Temperature stability

Step 7: Fine Tuning Inside the Node (optional but deadly)

Once you find a promising window:

Narrow increments (0.003–0.005")

Example: 0.018..0.020..0.022

Shoot 5-shot groups.

This is how sub- $\frac{1}{4}$ MOA loads are found.



Step 8: Confirm With Volume (truth test)

Never trust one tiny group.

Load:

Final seating depth

Same charge

Shoot:

One 10-shot group or three 5-shot groups

If it repeats: ■ That's your load.

Seating Depth vs SD (important reality check)

Seating depth:

Rarely improves SD

Often slightly worsens it

Dramatically improves grouping

That's normal.

Accuracy $\neq$ low SD.

Why Seating Depth Is So Powerful

Powder tuning:

Adjusts when the bullet exits

Seating depth:

Adjusts how the bullet enters the barrel

Bad entry = no amount of powder fixes it

Good entry = average velocity shoots tiny

Common Seating Depth Mistakes

Changing charge and depth at same time

Measuring COAL to tip

Testing too close to lands first

Declaring victory after 3 shots

Chasing the smallest single hole instead of repeatability

Throat Erosion Reality (long-term accuracy)

As you shoot:

Lands move forward

Jump increases

Groups slowly open

Fix:

Periodically chase your seating depth

Maintain the same jump, not same COAL



This is how match shooters keep accuracy for 1–2k rounds.

Final Mental Model (lock this in)

Charge weight = stability

Seating depth = alignment

Alignment = group size

One-sentence summary:

Seating depth tuning works by finding the jump where bullet release and rifling entry are most consistent, collapsing dispersion into tight, repeatable groups once charge stability is already solved.