HEADSPACE

The most misunderstood measurement in your rifle, explained plainly.

CAP COAST GUNSMITHING · YEPPOON, QLD

A First Round Effect knowledge guide

Why this guide exists

Headspace might be the most talked-about, least-understood measurement in the whole of shooting. It gets mentioned in every “is my rifle safe” conversation, quoted in forums, and nodded along to at the range, and yet if you quietly asked ten shooters to explain exactly what it is, you'd get ten different answers, and most of them would be a bit wrong.

That's not a criticism. Headspace sits in an awkward spot: it's fundamental to how a firearm works and how safely it works, but it's invisible, it's measured in thousandths of an inch, and it behaves differently depending on the cartridge. No wonder it gets muddled.

So here's a plain-English walk through it, no jargon for the sake of it, no assumed knowledge. By the end you'll understand what headspace actually is, how it's checked, why it matters, and the handful of things even keen shooters get wrong. Read it once and you'll know more about it than most people at your club.

Safety first. Data always. Ego never.

The basics

What headspace actually is

Strip away the mystique and headspace is simply this: **the amount of room your cartridge has to sit in the chamber, front to back, once the action is closed.**

More precisely, it's the distance from the face of the closed breech (the flat the base of your cartridge rests against) to the feature in the chamber that stops the cartridge sliding any further forward. That “stop” is the key: every cartridge is held in place by *something*, and headspace is measured to whatever that something is.

Why does that gap matter so much? Because your cartridge case has a hard job. In the fraction of a second after you pull the trigger it has to seal the chamber so burning gas goes down the barrel and not back at you, grip the chamber walls to stay put, then relax a hair so it can be extracted.

The case can only do that job well if it's sitting in the right amount of space. Too little and it's a struggle to chamber. Too much and the case gets stretched and abused, which is where the danger lives. We'll come back to both.

The one-line version: headspace is the fit between cartridge and chamber, lengthways. Get it right and everything else works. Get it wrong and you're either fighting your rifle or risking it.

Cartridge families

It depends on your cartridge

Here's the first thing that trips people up. Headspace isn't measured to the same place on every rifle. It's always measured to whatever stops the case going forward, and that changes with the cartridge family. In rifles there are three main families, plus rimfire.

Rimless bottleneck – the shoulder. Most modern rifles: .308, .223, 6.5 Creedmoor, .30-06. No rim to hang on, so the case hangs on its **shoulder**, the sloping step where the body narrows to the neck. It's why “shoulder bump” matters so much to reloaders.

Rimmed – the rim. Many classics and lever guns: .303 British, .30-30, .45-70. The rim rests on the back face of the barrel, so headspace is basically **the thickness of the rim**. Simple and forgiving.

Belted magnum – the belt. The .300 Win Mag, 7mm Rem Mag family. The raised band ahead of the extractor groove gives a firm stop, so the case headspaces on the **front edge of the belt**. (Gem coming up: factory belted ammo headspaces on the belt, but once fired, many effectively headspace on the shoulder instead.)

Rimfire – the rim. The .22 LR and friends: same as centrefire rimmed, the rim thickness sets the headspace. Worth a mention because so many shooters learn on a .22 without ever knowing that's how it's held.

A working shooter's brass drawer. Every one of these headspaces on a different feature depending on its family.

The clever bit

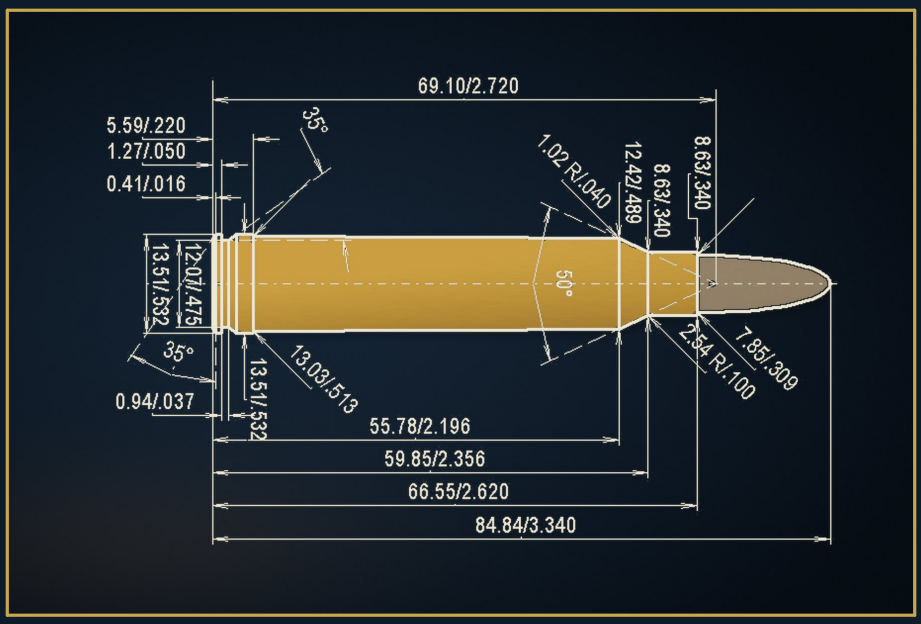
The datum line

If a bottleneck case stops on its shoulder, and a shoulder is a *slope*, how do you measure to it? You can't reliably put a caliper on a cone.

The answer is a neat piece of engineering thinking: the **datum line** (or datum circle). Everyone agrees to measure to the exact point on the shoulder where it passes through a **specific diameter**, a fixed reference circle. Measure to that circle every time and you get a repeatable number, even though the shoulder is a slope.

Different cartridges use different datum diameters, but the principle is universal: pick a diameter, measure to where the shoulder crosses it, and everyone is talking about the same thing. It's the reason two gunsmiths on opposite sides of the world can measure headspace on the same cartridge and agree.

You don't need to memorise datum diameters. You just need to know *why* they exist: they turn a vague slope into a precise, checkable number. That's what makes gauges possible, which is next.



Every line on a cartridge is defined against fixed reference points. The datum circle is how a sloping shoulder becomes a measurable number.

How it's checked

Go, No-Go and Field

Go, No-Go and Field gauges: precision steel stand-ins for a cartridge of known length.

You don't measure headspace with a tape measure. You check it with precision-ground steel gauges that stand in for a cartridge of a known length. There are three you'll hear about.

GO is cut to the *minimum* correct length. The action should close on it with no fuss. If it closes on GO, the chamber will accept properly-made ammunition.

NO-GO is cut a few thousandths longer (commonly around .004″, though it varies by cartridge and gauge maker). The action should **not** close on it. If it does, the chamber is on the long side: not necessarily unsafe yet, but heading the wrong way and worth a closer look on a used rifle.

FIELD is longer still, the safety backstop. If the action closes on a FIELD gauge, headspace is at or past the danger point and the rifle should be checked before it's fired again. (Honest note: FIELD is originally a military idea, a battlefield “is this still safe” limit, rather than a formal industry spec.)

The simple mental model: **close on GO, don't close on NO-GO, and never close on FIELD.** And remember, those gauges aren't measuring the cartridge, they're measuring **the chamber**. Headspace is a property of your rifle, not your ammo.

No gauges to hand? Two old-hand field checks are on the next page.

For when the set's not to hand

Two tricks from the old hands

Proper gauges are the right answer and cheap peace of mind. But every experienced gunsmith keeps a couple of no-gauge field checks for when the set isn't handy. Here are two worth knowing. Neither replaces gauges, and both are rough indicators only, but they've saved a lot of shooters a lot of grief over the years.

1. The Scotch tape check

Place one or two thin layers of clear Scotch Magic tape (roughly 0.002 to 0.003 in per layer) on the base of a sized case or a Go gauge to fake a “No-Go” feel. Chamber it and work the bolt: if it closes smoothly on the plain case but resists or won't fully close with the tape added, your chamber is likely in a practical working range.

Tape thickness varies and it can't guarantee safety, so treat it as illustrative only.

2. The high-seat primer trick (handy on older actions)

Another one the old hands used on rimless bottleneck cartridges, with nothing but a primed empty case as a self-adjusting depth gauge. Seat a primer deliberately proud of its pocket, sitting high by about 0.010 to 0.015 in.

Chamber the case and close the bolt firmly. As it locks, the bolt face presses that high primer back into the pocket until it stops hard against the bolt face. Extract the case and measure how far the primer still protrudes with a depth micrometer or calipers: whatever's left is a direct read on the slop, the excess space between the case base and the bolt face.

Like the tape check, it's a rough indicator, not a substitute for proper gauges. If a result looks marginal, confirm it with a Go/No-Go set or a gunsmith. Safety first, always.

Why it matters

The two ways it goes wrong

Headspace can be wrong in two directions, and they cause very different problems.

Too little (tight headspace). The cartridge doesn't quite fit the space, so the action is a fight to close: stiff bolt, crush-fit, sometimes it won't lock at all. It can make extraction stubborn and stress the mechanism. Tight headspace is mostly a **function and reliability** problem, annoying and occasionally enough to stop the rifle working, but you usually feel it coming.

Too much (excessive headspace). This is the one to respect. With too much room, the case sits back off its stop with a gap in front of the base. On firing, pressure grabs the front of the case against the chamber walls while the base is driven back into that gap, so the case **stretches**. Do it once and you get a shiny stretch ring near the base. Do it repeatedly, or badly enough in one go, and the case can **separate**, releasing high-pressure gas back through the action. That's the failure that hurts people.

So the balance is simple to state: **enough headspace to chamber and function reliably, but no more than necessary.** That sweet spot is why gunsmiths fuss over thousandths of an inch, and why “she'll be right” is the wrong attitude to a rifle you can't get to close, or one that's been around the block.

Case-head separation: the head has torn clean away from the body. This is what excessive headspace does when it's left to run.

Myth-busting

Three myths worth killing

Myth 1: “Tighter is always better.” Tempting, because tight sounds accurate. But too tight and the rifle won't run: hard to chamber, hard to extract, stressed. The best chambers are set just off minimum, not crushed. Tight isn't a virtue in itself.

Myth 2: “Any looseness is dangerous.” A little more than minimum isn't a crisis. Many sound designs run happily with some clearance, and factory ammo is made to cope with a range. What matters is staying the safe side of the FIELD limit. Panic isn't the response, checking is.

Myth 3: “There's one perfect headspace number.” There isn't a single magic figure, there's an acceptable **range**, from minimum (GO) up to the safe maximum. A rifle anywhere sensibly inside that band is fine.

The theme across all three: headspace is about being **inside the right window**, not hitting a bullseye, and definitely not about being as tight as possible.

For the keen

The gems even keen shooters miss

Belted magnums often headspace on the shoulder anyway. The belt is meant to be the stop, but most belted rounds also have a proper shoulder. Factory ammo headspaces on the belt, but once a case has been fired a few times it can effectively headspace on the shoulder instead. Worth knowing if you shoot magnums and want your brass to last.

.308 Winchester and 7.62×51mm NATO are not the same for headspace. The cases look identical, but the military 7.62 NATO chamber is spec'd differently and uses different gauges. Don't assume a .308 gauge tells the whole story on a milsurp 7.62 NATO rifle, or the other way around.

Excess headspace is almost always the gun, not your brass. If you're seeing stretch rings or separations, the instinct is to blame the ammo. Occasionally that's a factor, but far more often it's a worn or tired chamber, not good brass. The rifle is telling you something.

Learn to read the warning signs. A protruding or backed-out primer, a bright stretch ring just ahead of the case head, flattened primers, or brass that won't last more than a couple of loads. A bolt that suddenly closes *too* easily on brass that used to be a firm fit is worth a second thought too.

Brass logged and gauges to hand. The habit that keeps small problems from becoming big ones.

Peace of mind

When to have it checked

You don't need to lie awake over this, but there are clear moments when a proper gauge check is smart, not paranoid:

- You've bought a used rifle and don't know its history or round count.
- Anything's been changed at the business end: new barrel, new bolt, a bolt swapped between rifles, or a rebarrel.
- You're seeing the warning signs: stretch rings, protruding primers, short brass life, or a bolt-close feel that's changed.
- A milsurp or mixed-parts rifle where you can't be sure the bolt and barrel grew up together.
- You reload and want to set your dies up properly against a known-good chamber.

A headspace check with proper gauges takes a competent gunsmith a few minutes and tells you exactly where your rifle sits in that safe window. It's one of the cheapest bits of peace of mind in shooting.

Where to go from here

You understand it now. Most people never will.

Headspace is one of those topics that, once it clicks, changes how you look at your rifle. You stop seeing a black box and start understanding the system. That's exactly what we do at Cap Coast Gunsmithing, and it's the whole idea behind our long-range programme.

Want more like this?

This is one guide in a growing library of straight-talking explanations of the things that actually matter in precision shooting. Join the list and we'll send the next ones as they land, plus the occasional thing we don't publish anywhere else. **Join the list →**

Want the whole picture?

Headspace is one piece of how a rifle, a cartridge and a shooter come together to put the first round where you want it. That's First Round Effect, the CCG Long Range Programme: 25 structured modules, metric, with its own companion app. **See the course →**

Need your rifle checked?

If anything here rang a bell, bring it in. We check headspace with proper gauges and tell you straight where you stand. **Book a headspace check →**

Safety first. Data always. Ego never.

A note on safety

Before you close this

This guide is general education, not a substitute for a hands-on inspection by a qualified gunsmith. Headspace involves firearm safety: if you have any doubt about a specific firearm, stop, and have it checked by a competent gunsmith before firing. Cartridge examples are illustrative, always work to the correct specifications for your exact firearm and cartridge.