
The Small Arms Test Unit

The University of Arkansas at Little Rock

What Are Headspace Gauges?

Headspace and the usage of headspace gauges generate a significant discussion, and often debate, when the subject comes up. Safety of a firearm is tied to the cartridge headspace, as excessive headspace can allow the brass cartridge case to rupture. Too tight headspace will not allow the cartridge to chamber correctly. With this said, it is obvious that headspace is simply the clearance of the cartridge in the firearm chamber.

Headspace gauges measure this clearance, and are in simplest terms a cartridge shaped chamber gauge. Some firearms utilize the cartridge in different manners, and so they are said to "headspace" in different ways. The familiar bottleneck rifle cartridge normally "headspaces" from the bolt face to the chamber shoulder, ie, the cartridge fits into the chamber and the "clearance" is measured from specific points on the shoulder referenced to the bolt face. In some rifles and many handguns, a rim is used on the cartridge. In these, headspace is normally measured from the chamber rim contact point to the bolt face, as in the Lee-Enfield .303 rifle or a .30-30 rifle. Some use a belted cartridge, and the measurement involves the belt.

In any case, headspace centers around the proper and safe "clearance" of the cartridge in the firearm chamber. The gauges are made to allow this measurement, and are precision tools/instruments, like a micrometer or precision calipers. Normally, they are not adjustable, but are purchased in pre-determined lengths, based on standards adopted by the military or industry, which have become standard practice. The three gauges normally used are the "go", "no-go", and "field" gauges, and best practice would have these available as a set for each caliber of interest. Often, gauges are available in some fraction of measure for a particular caliber, such as were advertised for use in FAL rifles a few years ago, armory surplus. Such a set may have 8, 10, or more gauges, and can be used to precisely determine headspace for a particular caliber, .308 in that case.

The "go" gauge simply provides a measure of the headspace necessary to allow the firearm to chamber a round, needed when reaming chambers into a new barrel, etc... While necessary for the gunsmith or armorer, the go gauge may be of little use to the collector or surplus firearm purchaser, as the firearms in this case SHOULD have been properly headspaced when new, or when rebarreled. Firearm chambers don't get tighter under use, but loosen up for a variety of reasons.

"No go" is the maximum headspace measure recommended for new firearms. Note the term new in that, as in coming out of the factory. It is allowed and safe for the firearms chamber to be right at "no go" from the beginning, not a problem... For example, a new Remington rifle may be ANYWHERE between go and no go and pass factory inspection, and be sent out (I am not commenting on Remington's practices, it could be tighter)... Certainly, military arms were passed when their chambers headspace measured between go and no-

go. If your surplus firearm chamber measures between these two gauges, or it "closes on a go, won't close on a no-go", it indicates the arm has headspace similar to that acceptable for a "new" or just out of the factory firearm.

"Field" gauge is the "in use expediency" measure. It is for firearms in use (in the field), which have some wear associated with them, and measures up to some selected maximum headspace, normally considered "unsafe". Note there is sometimes some differences in these measurements, as in the British Lee Enfield, with their notoriously sloppy chambers, and the WWII Field gauge, which was longer (more headspace) than the now accepted specifications. There are other examples, but I have experience with this one, and it is well known. While not accepted by all, the use of a field gauge to indicate a "safe to fire" firearm WAS used by all the major military forces during the lifetime of a surplus firearm, and was accepted practice. Is your surplus firearm safe if it "won't close on a field gauge"? It was "safe enough" for use by GIs for the M1 rifle, the British for the Lee-Enfield, etc..., and may have come to you unchanged since that use (as far as headspace). YOU determine what you feel is safe for your useage. IF A FIREARM CLOSES ON A FIELD GAUGE, I recommend that you NOT FIRE that arm. According to acceptable practice, that arm is out of spec, and has excessive headspace, and may be dangerous if fired.

Basically, unless you are installing new barrels, you don't need a "go", and even then, a factory cartridge can provide that (some would flame me on that one!)... no go is nice to verify the condition of the firearm (hey, it passed a no go!)... field is likely the more useful for many surplus arms. I have all three for several calibers, and I have never needed or used the "go", but often use the field and no go...

Use of Headspace Gauges

1) unload the firearm, and strip it down to the bolt and barreled receiver (don't take this overboard, most Mausers are fine as is, but a Garand needs the op rod and spring out). Basically, you want no items that will interfere with your moving the bolt of the firearm by hand, with no or very little pressure. A Mauser doesn't offer interference, and is hand operated anyway, but an M1 has the Op Rod in the way, and it is under spring tension. An FAL needs to be "broken open", and then remove the bolt cover and carrier, to allow you access to the bolt. Remember, each arm is different, and bolts lock in different ways (rotating lugs, tilting bolts, etc). If you can't understand what I am talking about, can't strip the arm to this level, or are confused on these issues, you don't need to be checking your headspace. Get a qualified gunsmith to make this measurement for you!

2) remove the bolt, if the extractor or ejector is spring loaded, or offers resistance in chambering, remove them. Again, many Mausers don't need anything removed, BUT a Garand needs both removed to do the job properly. You want no added tension to the "feel" of the bolt. Remove anything that drags or causes tension in your firearm! The picture shows a stripped M1A bolt, and a "no-go" .308 headspace gauge.



3) place the gauge in the bolt face, and into the chamber (differs for each firearm, a Mauser can actually strip the gauge out of the mag if you wanted, a Garand has to have it held on there until the bolt is closed). NOTE, you are closing the bolt with hand pressure only, NO OP ROD or SPRING is used to close anything, you removed them, right? Picture shows closing the stripped M1A bolt on the gauge using light finger pressure...



4) gently close the bolt on the gauge. I use two finger pressure. When the gauge touches the chamber end, and you feel it, you have measured the headspace! This is like using the calipers or the micrometer in shop, as soon as it touches, you are done! IF the bolt CLOSES WITH NO RESISTANCE on the first gauge, keep going. That gauge is too short to measure the headspace... M1A bolt closes on "go" gauge, below...



5) select the next gauge (normally, go, no go, then field), repeat number 4 above. You are looking for the gauge that won't allow the bolt to close with light pressure applied. In the M1A below, this is the "no-go" gauge.



6) when you find the gauge the bolt WON'T CLOSE ON, and you know the one it DID close on, your headspace is between the two gauges. Between go and no-go would be best, between no-go and field may be acceptable (you decide). Also, usually, one measure is adequate for surplus arms, ie, "won't close on a no-go", or "won't close on a field" tells you what you need to know if the arm was properly assembled in the first place. The picture below shows a 98 Mauser action NOT closing on a gauge... REMEMBER, use only finger pressure! I guarantee I can close this Mauser action on the gauge that's in there, if I "shove it on down"!!! FINGER PRESSURE ONLY!



In the pictures, the M1A (with stripped bolt) closes on the "go" gauge, but will not close on the "no-go" gauge. Note the use of "two finger" pressure only on the bolt. The Mauser shown closed on the "go" gauge, and would JUST CLOSE ON NO-GO WITH GAUGE CONTACT. There was slight resistance. The actual picture shows contact using the .308 field gauge in this Israeli 7.62 conversion barrel...

Remember, don't force anything. These measurements are on the order of a few thousandths of an inch. Did you crank the "mike" down on items in shop? NO! Ease into this measurement, also. I can close any of the gauges in a Mauser bolt rifle, or a Lee Enfield, by just mashing the bolt handle down. There is enough springyness in the steel to do so. Ease it in until the gauge touches, you are done...



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