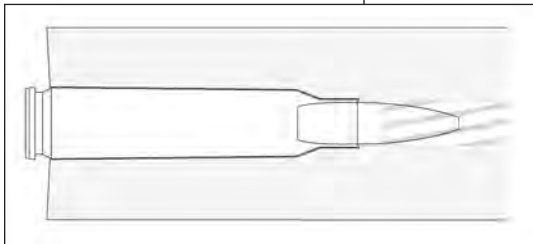


AR15 Chambers

[knowing what you have is as important as what you have]

Glen Zediker

Jump is the distance a bullet must travel to engage the lands or rifling. Land diameter in most .224 match barrels is 0.219 inches so it's at that same point of bullet diameter where we should base a measurement.



These tools will tell. The Stoney Point Chamber All Gauge is a wondrous thing. It lets you take the bullet you shoot, scoot it forward until it engages the rifling, lock down the tool, remove and measure to get an accurate figure. Invaluable. It tells you the overall cartridge length that has any bullet – that's your bullet – touching the lands in your rifle. It's accurate and easy. Get the angled version since it works best (I've proved that too many times to say "may"). This tool comes in handy for checking new barrels of uncertain chambering specs.

Enough experience and enough notes will tell you right off if you've got a long or short throat, and how long or how short. It's also rightly used to keep up with throat erosion.

ORIGIN: This is a jist of an article I did for another magazine. I added a few things that I don't send to magazines due to space concerns.

So I don't leave anything out, I'm going to start this off pretending nobody knows no nothing. A rifle chamber is a hole that has been cut in the breech end of a barrel so a round of ammunition will fit into it. It's a lathe operation. A chamber "reamer" is the tool that cuts this hole and is shaped the same as a cartridge case with at least part of a bullet stuck in it. The reamer is going to cut out the case body and shoulder silhouette, the case neck, and then extend into the bore to form a bullet profile silhouette. It's here, the bullet profile area, where major tooling differences exist. There are a lot of different .223 Remington reamers. The two most commonly used in factory-done guns are at opposite ends of this universe -- one is the shortest, and one is the longest.

Let's look closer. What I called the "bullet profile area" is technically called a "leade." We also can call it the "throat." Inside the chamber, the distance between the end of the case neck and the first point cut into the rifled portion of the barrel that coincides with bar-



rel land (rifling) diameter is the preeminent variable determined by the reamer. Land diameter will be the smallest dimension inside a bore. If the first point of full land diameter (usually 0.219 inches in a .224 caliber bore) is farther from the end of the case neck (farther into the bore), then the chamber has a longer leade or throat. The bullet won't contact the lands until, of course, it reaches the point on the bullet that coincides with land diameter. I call this the first point of "major diameter" on a bullet. The effect or influence of this conical space ahead of the case neck is simple: the more space the less pressure, and the more space the farther the bullet must "jump" until the bullet contacts the lands. Read all that again.

Now, SAAMI (Small Arms and Ammunition Manufacturer's Institute) long ago set its standards for .223 Remington based on bolt-action rifles chambered for this round. These bolt rifles were configured for



Here's what I'm talking about. These are three Sierra 80-grain MatchKings seated to engage the lands for three different chambers. On the left is a NATO, middle is a "Wylde," right is a SAAMI minimum.

Don't get too "precise" in chambering an AR15. Leave that to the single-shot crowd who tediously and continuously prepare their ammunition. Don't ask for a headspace that's too tight (short), a neck diameter that's too small, a body area that's too close to new case dimensions, or a leade that's too short. The limits, to me, are found in looking at the ammunition you want to be able to fire in the rifle, and also what you want to obligate yourself to in the way of making dimensional corrections in your handloading process. I believe that an AR15 chamber should be able to accommodate just about any ammunition. The good news is that you won't see any difference in on-target performance. This rifle can't show it. The main effect of "matching" ammo specs and chamber specs is longer case life and less dimensional change firing to firing. Have the chamber polished and keep it clean!

varminting. There, of course, was originally a military chamber, and round, in use since the .223 Remington commercial round was renamed from the 5.56x45mm (NATO-spec) cartridge. The SAAMI chamber has a good deal shorter leade or throat than a military NATO-spec chamber. There is material elsewhere addressing the reasons this was a bad idea (SAAMI's bad idea), and it's become an even worse idea because it's never really been adequately explained to the folks, like you and me, who load or purchase ammunition for AR15s. See, off-the-shelf AR15s can have "either" chamber. Even worse, some barrels are not marked and some are improperly marked. Compounding matters (but not necessarily making them worse) is that competitive use of AR15s resulted in even more chambering options, and reamers. These came about after 80 grain bullets became available, and then became immediately popular. The SAAMI was too short and the NATO was too long.

So the rest of this will make sense, the following dimensions are all based on an overall cartridge length that will have a Sierra 80 grain MatchKing bullet just touching the lands when the round is chambered. We don't all shoot Sierra 80 grain MatchKings, and we don't all set them to touch the lands, but most competitive High Power Rifle shooters do both. At the least it's a "standard" that gives us a point to work from. What I call the "Derrick Chamber" (Derrick Martin of Accuracy Speaks) needs 2.442 inches overall cartridge length; the "Wylde Chamber" (for competition-use AR15 pioneer Bill Wylde) is 2.475; the "AMU Chamber" (for U.S. Army competition team) is 2.500. There are others, but these are the most popular among competition rifle builders. A SAAMI chamber is normally about 2.410; a NATO chamber is normally about 2.550. Those are huge differences, and I counted five different reamers just mentioned here. I'm using a whopper of a throat with 90-grain bullets now – 2.550, pretty much a NATO.

If we're shooting different bullets in the same rifle, and these bullets are quite a lot different in overall lengths and profiles, there's no way to get things how we'd like them to be in any variation on a chamber. Shortening the leade area to minimize jump with short bullets that have to make magazine box length constraints does no favors to the longer, heavier bullets since it requires setting them too far back into the case. That is generally considered a bad thing. Getting the longer heavier bullets some room to stretch, and the case some room to breathe, means that shorter bullets are facing a jump of relatively epic proportions to get started into the bore. That is generally considered a bad thing.

Which generally bad thing is worse, or better?

Chambering specification doesn't matter all that much to accuracy, but it can to round performance -- not the same thing. The .223 Remington has a short case neck, a small body, and a, well, it's not the perfect round for 600-yard performance. It is, however, what we have to work with. Making it work its best means giving as much room as reasonably possible to the long bullets. This is done to prevent seating them so far back into the case. We need all the powder capacity we can get. I'm a fan of longer rather than shorter in leade specs. Others disagree. There's no answer that can't be argued beyond an average man's concept of a "day."

A longer throat doesn't seem to matter to the performance of shorter bullets. That's not to say it couldn't matter, but for it to positively influence groups using, say, a 77 grain Sierra MatchKing, the throat would have to be way shorter than what anyone uses in a High Power chamber. I've jumped to my own conclusion that once jump exceeds a few thousandths I'm not sure it matters. Jumping 0.015 isn't going to help much more than jumping 0.035. Reality is that we're shooting targets for score, and we, therefore, must judge the supposed good or bad effects from compromises by score. It's really common and easy to clean a 300-yard High Power Rifle target, with a high X-count, in a "long" chamber shooting "short" bullets, like the Sierra 77. That target has a 7-inch 10-ring.

[KEEP READING. THERE ARE SOME FAIRLY IMPORTANT THINGS TO KNOW ON THE NEXT PAGE.]

5.56mm NATO vs. SAAMI .223 Remington

Pay attention to this! Out of the box, chances are an AR15 will have either a SAAMI or a NATO chamber. There are huge differences. Specifically, 5.56x45mm NATO specs call for a longer leade than SAAMI defined for commercial .223 Remington (which was originally determined for bolt action rifles). Leade is the portion of the barrel ahead of the chamber where the rifling has been conically removed to allow room for the seated bullet. A shorter leade raises pressures. Compounding this, military ammunition is nearly always loaded to higher pressures than commercial. Shooting 5.56mm mil-spec ammo in a SAAMI “minimum” .223 Remington chamber can jump up chamber pressure 15,000 psi, or more. Not all AR15 barrels are correctly marked, and some aren’t marked at all. Know by asking the manufacturer, or just shoot “.223 Remington” ammunition and don’t worry. Know also before selecting loading data. If loads were worked up in a NATO chamber (Colt HBAR, for instance), they will be over-pressure if used in a SAAMI chamber.

There will be so daggone much more about this in the new AR15 book. I had several different chambers cut in Service Rifles and tested differences, and, of course, offered opinions. What I found was somewhat predictable, but then there were a few surprises too... Of peculiar and particular interest were the results with varying weight bullets fired in the “90-grain” chambers. Learned a lot, and so will you.