



Fine Tuning Brass Resizing

Resizing Die Adjustment, Fine Tuning for the Mil-Surp Rifle Chamber

By [Mark Trope](#) & [R. Ted Jeo](#)

Saturday's finally here, the gun show's in town, and you have some disposable income! Hey, it doesn't get any better than this!

Making the rounds of the various tables, you find your mil surp treasure! The price is right, and you do the required paperwork. While the dealer is doing the instant check, you head back over to the table of the fellow with all the new dies, shell holders, bags of new bulk brass, bullets etc. Cool, he has everything you need for your new caliber.

At home, while the disassembled rifle is soaking in various solvents, it's time to set up the new reloading die set. A prudent and cautious reloader would do well to read the instructions in the die box.

I recently checked the instructions from four different die producers to see what they recommend. Full-length die instructions from two of the companies say, "Install the shell holder in the ram, raise the ram to its highest point and turn the sizing die in until it firmly contacts the shell holder. Tighten the die lock ring." Two other vendors further advise: "Lower the ram slightly, and turn in the die another $\frac{1}{4}$ to $\frac{1}{3}$ turn. Tighten the die lock ring." Not bad advice. These instructions will certainly produce a resized case that will fit in a mil surp chamber. However, is it possible to do just a bit better? Is there a way to get a slightly better fit than a complete, full length resizing? And, of course, being the "cheapos" that we are, is there a way to extend the life of your brass?

If you are one who reads articles here on Surplusrifle.com you may have already read the article "[Measuring Headspace](#)". So, we will just recap a few points on that aspect.

For just a moment, let us consider what happens when a new or resized cartridge is fired in a rifle chamber. When the trigger is pulled, the firing pin drives the case forward in the chamber. Forward movement is arrested by one of two means. In a rimmed cartridge like the 7.62X54R or .303 British, the rim striking the back of the chamber arrests forward movement. In a rimless case like the .30-06, 8X57, 7.62 NATO, etc, a datum on the case's tapered shoulder striking the mirror image part of the chamber arrests forward movement. The cartridge fires, and pressure from the expanding gases cause the case to stretch in length and width, assuming the shape of the chamber. Brass, because of its natural elasticity, will shrink a tiny bit after the pressure has decreased. However, the case will not return to its previous (unfired) size. The case, after firing, is now considered "fire formed". Provided pressures were normal for the cartridge, the brass will eject out of the chamber easily. If one were to take that fired cartridges case and put a new bullet in the neck, the bullet would slide in easily because the neck did not rebound back to its original size. Now is the time the brass must be resized before it can be reloaded again.

By the way....

One should NEVER put grease into the chamber of a rifle. AND, before you start shooting, you should quickly run a swab into the rifle chamber to wipe out any oil that may have ended up in there from your last cleaning AND visually inspect to make sure you have nothing stuck in your chamber/barrel/action. The reason?

Well, first off, we have to take a second look at what has just written above. Remember, upon powder ignition, the brass of the case expands and "moulds" itself to the shape of the chamber.

Essentially, the walls of the rifle chamber arrest any movement of the brass at this moment. If there is any sort of lubrication, the case may be able to move backward in the chamber and could become unsupported by the receiver. This could cause brass failure.

Secondly, just prudently, it just is not very good for ANYONE or ANYTHING if you happen to have left a cleaning patch stuck in the barrel or some other object. It does not happen often, but you will KNOW when you do.

Source?

Julian Hatcher's book, "Hatcher's Notebook" is an excellent text of what can happen when things get into barrels and actions that should not be there. And, he goes into a lot of the development history of the 1903, M-1 Garand, M1917 and other US infantry

weapons.

For the sake of this discussion we will assume any reloading dies are made to industry standards, that is, they fall somewhere between minimum and maximum on the tolerance chart. Following the included instructions, the resizing die will reduce the length and width of a fired case to about minimum case standards. It should now fit in any chamber for that cartridge. Different purpose rifles chambered for the same cartridge will have different considerations when being chambered.

The amount of tolerance allowed (*between minimum and maximum*) is dictated by what the rifle is intended for. Benchrest chambers are right on the minimum side of the scale; they are made tighter for maximum accuracy. They are single shot rifles designed for one purpose only. Benchrest rifles are specialized tools, hand built, and ALL tolerances are held to the strictest standards.

Sporters tend to have somewhat larger chambers. These are the hunting rifles. Such rifles are usually mass-produced in factories. Their chambers are somewhat larger; they are within industry standards, usually somewhere in the middle of the tolerance scale.

The military rifle is also specialized, but in a different way. Military rifles have chambers that crowd the roomy side of tolerance. They must be able to feed and chamber rounds fast, usually from some sort of magazine. The ability to feed and chamber with utter reliability is paramount. On the battlefield, a rifle and ammo may be dusty, muddy etc. A rifle with relaxed tolerances makes sense in this scenario. Ammo is also often rated as "dual purpose", serving the needs of both the rifleman and light machine-gunner. Once again, a rifle chamber on the large side makes sense; the roomier chamber will help keep pressures down.

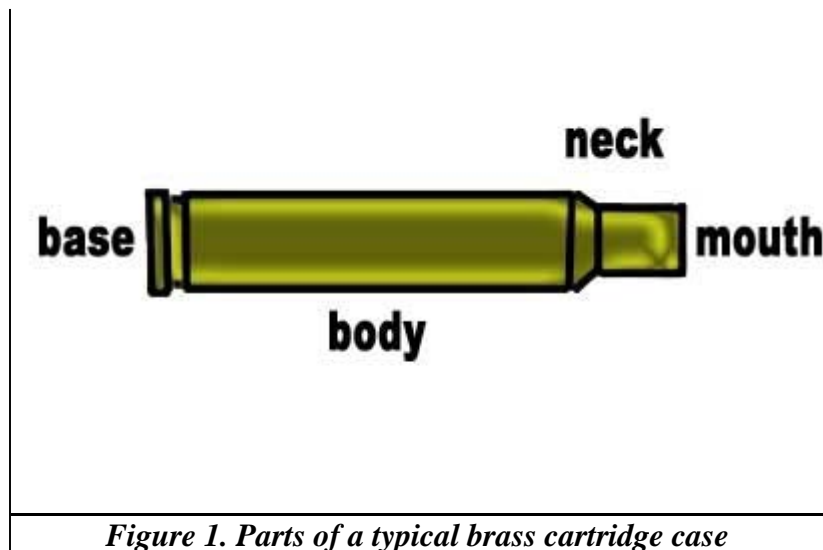
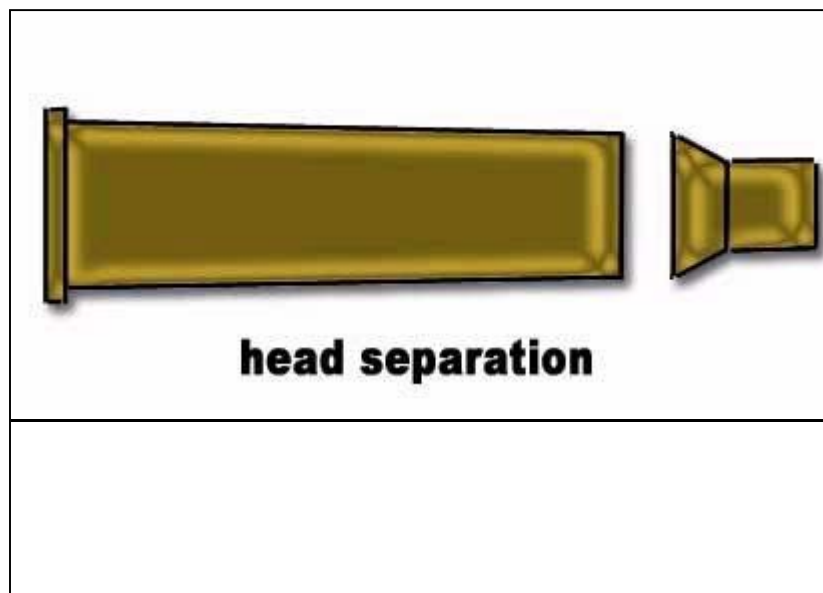


Figure 1. Parts of a typical brass cartridge case

Since the chamber on the military rifle tends to be the longest, complete resizing of the brass will push the shoulder back a lot more than need be. Upon firing, the shoulder will move forward again as the cartridge is fired. Certain rifles are notoriously hard on brass, namely the .303 British SMLE, an otherwise fine rifle. SMLE's are known for short brass life, and head separations are commonplace. In all fairness, this is not a design fault of the SMLE or any military rifle. To a government, a cartridge is to be used one time only. They do not consider reloading when designing a military rifle. Not so with the likes of the reloader, we want all the life a case has to offer. We keep our rifles and ammunition clean. Our retired military rifles now face paper and steel instead of flesh and bone targets. We have the luxury of not having to feed rounds in life or death situations.



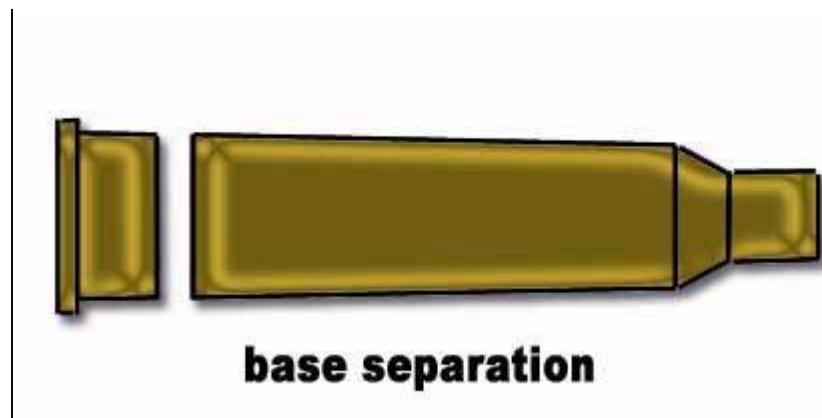


Figure 2. What can happen from excessive case stretch and overworking of brass!

Let's look at a procedure to resize the brass, but only move the shoulder back a minimum amount and minimally resize the body of the case. We will do this with the full-length resizing die.



Figure 3. A Lyman Universal decapping die, a very useful item for removing primers (crimped or not) without resizing the brass case. No lube is needed.

If you have a universal decapping die, go ahead and decap a case, which was fired in your rifle. Decapping separately is not required, but will help with the process.

With your shell holder in place, thread the full-length sizing die down until it just barely touches the shell holder with the ram up. Next, back the die up $\frac{1}{2}$ a turn and finger tighten the lock ring.

Take that same piece of brass, which was fired in your rifle, and smoke the shoulder with a candle. Wear a glove while holding the brass; it gets incredibly hot. Oh, by the way, I did say fired brass, right? OK, if anyone did not hear me I will say it again, nice & loud, FIRED BRASS!! Let the case cool.



Figure 4. The INCORRECT way of smoking a brass cartridge case!



Figure 5. The correct way of smoking a brass cartridge case.



Figure 6. Cases that were smoked on the shoulders and allowed to cool.

With shoulder smoked, carefully and lightly lube the case body. Avoid getting lube on the shoulder. Lightly lube the inside and outside of the case neck with a lube moistened cotton tipped applicator. Now resize the case. Upon withdrawal from the die, the smoked case shoulder should not show evidence of having touched the shoulder in the die. Turn the die down 1/8 turn at a time, continuing to resize the case until the smoked shoulder just barely touches the shoulder in the die. You will probably see evidence of the shoulder being touched by small patches of missing soot.

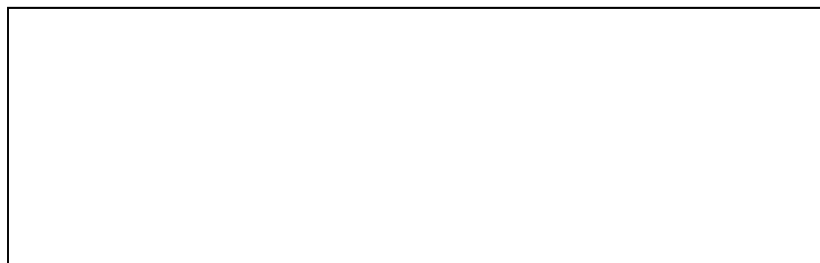




Figure 6. *It is not easy to tell from a photo, but the two cases on the bottom have very small patches of soot missing on the shoulder evidenced by some of the brass showing through.*

If you have been turning the die down in very small increments, the entire shoulder may not have been touched by the die. Chances are just a portion of the smoked shoulder will have been touched at first. Turn the die down just a tiny bit more until the entire shoulder shows evidence of making contact with the die. At this point it is time to try the case in your rifle. If your rifle is a Mauser 93 or 98 type, cock the rifle and set the safety in the center position. In this manner you will be able to feel the difference between an empty chamber and when a cartridge case is in the rifle. Try the empty case in your rifle by slipping it under the extractor first so it has a straight shot into the chamber. Alternatively, place it

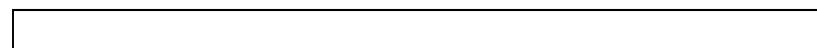
under the magazine follower and carefully allow the bolt to pick it up as if it were a loaded round.

If the bolt encounters quite a bit of resistance when you try to close it, continue to turn the die down in tiny increments, resizing the case, and then trying it in your rifle. The idea is to get the shoulder moved back to a point when the bolt will just close on a resized case while you feel the slightest bit of resistance. Now your full-length resizing die is adjusted to avoid excessive working of the brass case.

However, what if you have 2 or 3 rifles in the same caliber, and one full length die set? This is where a caliper comes into play. Every reloader should have a caliper. It matters not if it is a dial or digital unit. The digitals are easier to read. One of the least expensive sources for calipers is www.harborfreight.com. Now days, nearly all calipers are made in China, with the exception of a few very expensive Japanese and US models. The Chinese calipers are plenty good enough for our purpose.

Once the full-length resizing die is set for a certain rifle, take your caliper and measure from the top of the die to either the top of the press frame or from the top of the die to the top of the die lock ring. You may have to use an unorthodox method for this measurement as the actual "claws" of the caliper may not reach two points on the die at the same time, simple because of the way the die is shaped. Take a careful look at Figure 7 and note that the measurement is being taken with the TOP of the caliper resting on the lock nut and the SHOULDER of the other claw resting on part of the die. There are two things that are important to remember when doing this. First, you will need to use the SAME caliper when you want to reset your dies back to this measurement, being that one caliper may be designed differently, and secondly, the lock nut will have to be tightened the same amount each time. Record this measurement. Once the measurements are recorded for all rifles in this caliber, it will be easy to return to that measurement.

Take note, every rifle should have its own set of brass once this technique is used. Remember, each rifle is unique in how it fire forms the brass. Of course you could full-length size brass to take it back down to minimum size if you wanted to use it in a different rifle.



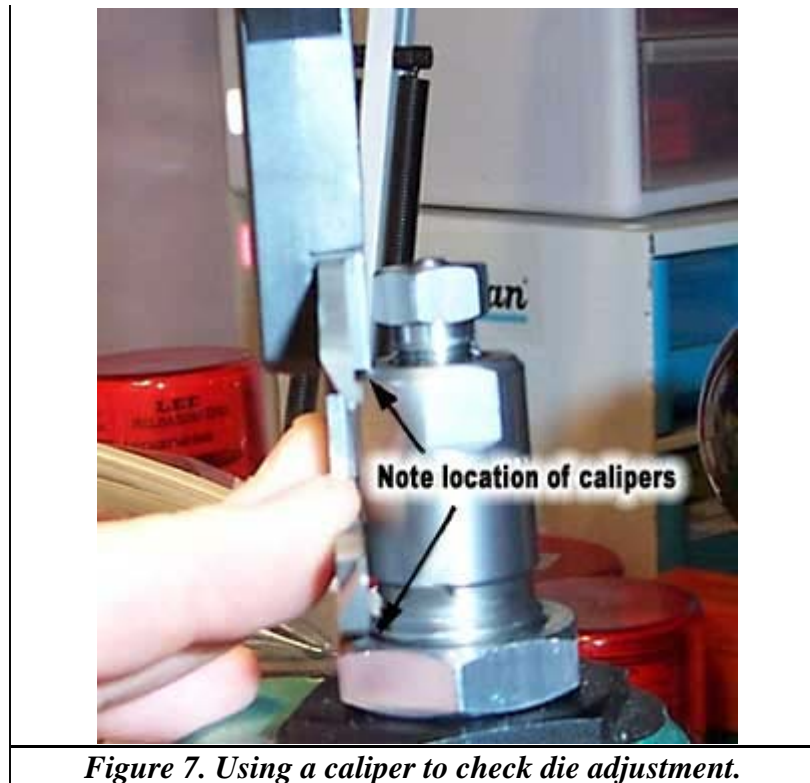


Figure 7. Using a caliper to check die adjustment.

I am sure some folks have realized that in many ways this procedure mirrors what a “Neck Size Only” die, which are available from many die suppliers, or what a Lee Collet die does. In fact the better way of describing this technique is a “partial full-length resize”, because, we are not working the entire case back to original size, but just the neck area, some of the shoulder and a little of the body. True enough, however, many of the less common mil surp calibers do not have a Neck Size or a Lee Collet die available, so, this procedure can extend the life of your brass. Just like when you bend a wire back and forth, eventually it weakens and breaks your brass cases go through a similar treatment by being stretched on firing and then reshaped back in resizing.

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