SECTION 9

RELOADING FOR THE MATCH M14

[pay attention]

[I need to say something here just so you'll all know. I had a few folks tell me it was a waste of time to include all this, and there's a lot included, on loading for the M14. Reason of course is because of its demise as ruler and yardstick in Service Rifle competition. Some may even think I am, not to blame, but one of the stake drivers from my works on AR15s. Nah. I like the AR15 better and think it is better, but I never said an M14 couldn't shoot. They do, indeed. By my standards, the best score ever (any and all) yet fired in competition was Pat Boyle's astounding 500-32 in 1975. That an M14 with M118 and one of the finest shooters who ever envenerated a rifle range. Another reason this material is important is because the 14 is not an easy rifle to load for, until someone knows what to do, that is, and then it's about the easiest. There are four things to do and about forty not to do. Point, though, is that there are numerous details the knowing of which is mandatory. Plus, I had all this stuff written now for years and I hate to throw out perfectly good words, so here's the day after Thanksgiving refeast, and it's not all turkey.]

[I use the term "M14" to denote this rifle type. Yes, the civilian counterpart and the one "we" all have is the M1A™ but that's a trade name from Springfield Armory®. M14 is descriptive enough, and easier to work with, and it's plain enough that we're talking about a semi-automatic competition rifle in this material.]

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[In case anyone is wondering why there's not a "Reloading for the Match AR15" section, it's because of this: one is much of it is in our book "The Competitive AR15," but it's mostly because there really isn't much quirky about the AR15. I made many, many specific references to considerations when they were specific to the AR15 throughout the main body of this manuscript. We have another book on the way out "The Competitive AR15: a technical guide," which, as its title suggests, will skin hide off the topic of teaching that rifle to like spinach.]

The Standard

Probably the best factory ammunition for a match-grade M14 is Lake City Match (LCM) M852. This is the "standard" most folks tried* to duplicate with handloads, and it's also constructed from the components which became the standard for handloads. The other LCM round is M118. The big difference between M118 and M852 is the bullet. M852 uses a commercially produced 168gr hollowpoint boat tail bullet and M118 uses the 173gr full metal jacket boat tail produced by LC. The powder used in each is a 4895 selected, so says Uncle, for optimal pressure characteristics. There are differences in head stamps, and M852 cases are knurled above the head to indicate that they're loaded with hollowpoint bullets and, therefore, not authorized for combat use (usually have an "NM" stamp too), but, aside from lot variances that affect all, the cases are materially the same.

[*This is primarily in past tense not because it's no longer viable or duplicable, and certainly not because the attempt isn't worth doing. Reason is that there are better bullets and subsequently better results available now as when I originally wrote this material. I still think whatever I say about the "old" loads is applicable. I updated this material as well as I could before this publication, but after getting into and through it again I decided that it was still "good," meaning mostly that I knew it still applied.]

I don't know if this needs donated to a museum yet or not, but it's (still) probably the best ammunition, overall, that can get fed to an M14. Some say "Federal®" and I say "schmedral." Others say you-name-it brand of "match," and I say save your money. Any of that stuff is easy to beat at home, at a huge savings too.

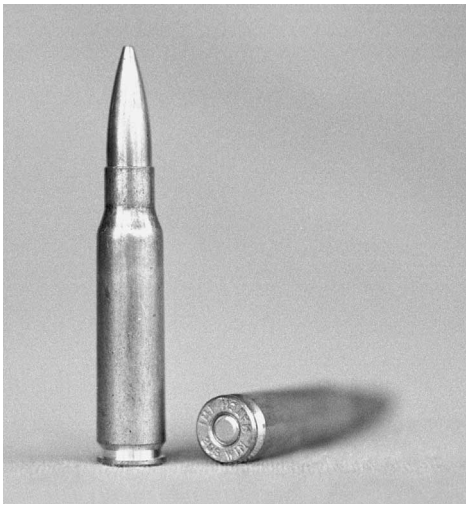
A Case for the M14

For those of us, which is most of us, who do not have reliable access to loaded LC Match rounds or good once-fired brass, it may help to know that there's also no material difference between LC Match and LC ball issue brass. LC Match brass has no primer crimp and its neck and shoulder area are annealed. Duplicating either of these in GI issue brass poses no problem, although the only honestly necessary step is eliminating the crimp.

The reason LC is given as the case of choice for the M14 has nothing to do with its quality (which ain't great) but has everything to do with its construction. LC cases are a hard alloy and relatively thick all

around, and especially dense about the case head area. LC brass is thick enough and hard enough to withstand the rigorous action operation, and its reduced capacity, compared to most commercial cases, makes efficient use of propellants in the burning range suitable for this rifle. [See the "Once Fired" download text on site for more.]

"Equivalent" cases can be had, and IMI® Match works well and can usually be purchased in quantity for no to little more than once-fired LCMs. Other makes have to be taken, literally, on a case by case basis. Compare case weights for an indication of relationship to LCs (usually around 180grs), and always keep in mind that loads will not be interchangeable. Popular commercial cases perform with results ranging from excellent to poor to dangerous. Most are not engineered for duty as recyclable stock in a brass monster like an M14.



The way I do (did) it was purchasing new IMI® cases. These are okay in quality but just right in construction. Although there can be fair differences in LC cases, it's right enough to say that the IMI® are the "same" thing. Same weight, same capacity, same strength, and, mostly, same performance from the same loads. I didn't even change zeros using IMI® against the "same" handload on LC. They're available with a "match" headstamp, but don't put faith in that: they're about same quality as LC.

The prerequisites for brass suitability are hardness as much as thickness. Some commercial cases are easily as thick as LC but they're soft, and soft does not work. Just because such and such brand of factory "match" ammo may shoot well through an M1A™, keep in mind that it is meant for one use, as is, technically, all factory ammunition.

One thing an M14 owner absolutely, unequivocally must accept is short case life. A few things may shorten it even further, but nothing extends it.

Never allow more than four firings on a case.

This means that once fired brass can be loaded just three times.

I owe an explanation.

For one, the M14 has about the quickest operation of any auto-loading rifle — so much so that the bolt can unlock before the case has fully retracted from its expanded dimensions. We're talking about milliseconds, but that's all we have devoted to the entire process. The net result is that some amount of additional expansion frequently occurs in a case fired through an M14. Compounding this condition is that LC brass is liable not to contract as readily as other cases fired in other rifles. It's very, very (comparatively) hot and getting jerked on by an extractor, and most seem to think this is responsible for a lot of the additional measured case growth.

Don't be fooled into thinking that brass from an M14 "fire formed" to fit the chamber; it may well have "fire deformed." A spent case from a 14 will often have the shoulder blown farther forward than chamber specs should allow, and may also exhibit more case head expansion than it "should."

Many (most) "match" M14s have comparatively big chambers, and many are also very tightly headspaced. The reamers most use(d) on 14s are 7.62x51 "match" reamers, not .308 Winchester reamers, and the dimensions are different, and

most annoyingly so in that they're a good deal larger at the back end. This is why an M14 case has to be strong, especially in the case head area. Also suffice it to say that it has to be resized a little more front and rear than many think it should. The reason for not using the .308 Winchester reamer is a matter of function (undeniably important) and also of suitability, which is partially a product of common practice. Lemmesplain: time was (is) that a majority of civilian Service Rifle shooters wanted to respect congruency with military team practices; not really done for great reasons, but that's the common part of the common practice. If that doesn't make any sense, it probably shouldn't. As far as I know (I had my rifles built by a USMC gunsmith) USMC used SAAMI spec .308 W. chambers for the Rifle Team guns but set extra tight headspace (and extra short freebore). I don't know if the reamer honestly matters to rifle performance, which is accuracy, but it influences case condition, which actually is a small influence, considering.

Anyhow. Let them fire four times and throw them away. Watch them in between but don't look at them again after number four. There are those who claim to have "fail safe" procedures for culling brass and think an M14 case should last a lot longer than I say, so if someone thinks he knows what he's doing, then he should do it. Just don't shoot next to me, thank you.

[There's only a tiny bit later on about gas system modifications that can allay some of this behavior, but if anyone wants to know more catch up with a good 14 builder and ask him about changing the valve specs.]

In case any of you all have heard references to the M14 "losing" headspace, meaning rifle headspace getting shorter as the rounds add up. Here's the deal: it's finish wear. Lap the lugs and keep them swimming in Plastilube and this shouldn't happen. There are several thousandths in the parts finish and when that's worn then that's siphoned off the headspace. Fix the finish first, guys, and there won't likely be any problems.

Fit Ammunition
[ammunition that fits]

Insufficient sizing is probably the most common and costly mistake made in loading for the M14. "Insufficient" is in both die design and operator discretion.

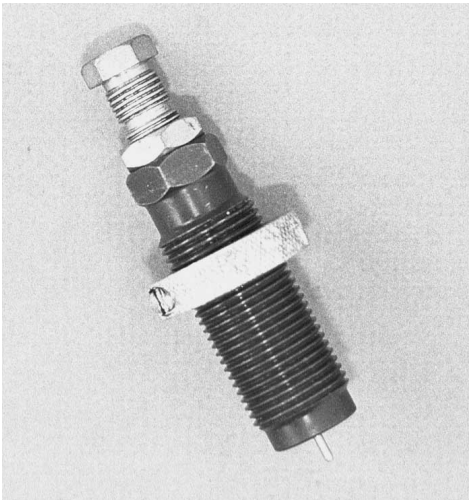
Conventional full length sizing dies may not do the trick. As started on, a rifle with a "match" chamber, which "should" (not necessarily wise, but likely) be a little shorter and bigger diameter, may not get along with a standard die. Since the case has to be sized down a little more than most from most other rifle types, a conventional full length die may not be up to it. If the rifle is performing well with full length sizing, run with it, but a small base sizing die will not negatively affect ammunition performance in any M14 rifle and is a recommended purchase, regardless of chamber specs. I've seen 14s shoot better groups after a switch to small base sizing. "Aw, c'mon..." No, really. There are high-theory ideas as to why this might happen, and, of course, just keep reading to find them, but it's mentioned mostly to emphasize that small base sizing will in no way hurt accuracy in this rifle.

Aside from one with a short or long chamber (not necessarily bad, depending on degrees), about the most commonly encountered "physical" problem we'll see in M14s is what appears to be slightly oval chambers. Some chambers are, indeed, measurably oval, and that's usually a reamer problem (mostly a spindle alignment issue, which is a gunsmith problem), but what is mostly at work is relatively extreme ejector pressure moving a relatively small (when new at least) case to one side of a relatively large chamber. That matters a ton. Any case fired under that set of circumstances gets that imprint. An oval (egg-shaped really) case going back into an "ovalling" chamber leaves consistency of fit, and therefore consistency of alignment, to chance. A standard die won't iron out as much deformation from a fired case as will a small base. So, if a case is sized so

it's just slightly smaller and more nearly round, in effect, and in theory, that case may "seek its own relief" (it probably won't find a center), and, therefore, may get more consistent alignment round to round. In practice, I have seen small base sizing improve the accuracy of more than one M14. Of course, sizing a case on down still means that the ejector is just as easily able to strong arm it up against the wall and continue the warping, but that's not the point: the point is that it may still shoot better on this firing, and "this" firing is the only one that matters. It is a matter of consistency, and if the only consistency is all the aforementioned abnormalities that work against the case, it's still better if there's little else compounding trying to hijack the bullet.

All a small base die is, is one that's cut to a smaller inside diameter near the case head area; taper is also less going down. It's more of a cylinder and less of a cone, in one way. How much smaller than "standard" depends on the standard (who makes it), and a good standard is one cut to a little under SAAMI minimums for the .308 Winchester cartridge. Most I've had are a little under new case dimensions, meaning they'll usually size an LC case back very close to where it started new. To be clear: even if a chamber in an M14 was relatively small in diameter (and some are at the customer's request or gunsmith's discretion), the brass will effectively overextend it and, because the brass is hard and unwieldy, may not get enough tool contact from a conventional full length die to attain and retain adequately small resized condition. That was wordy, but it was the most simple way to say it.

Here's one I bet most folks hain't put much thought to, but if a case can't expand, it can't shrink. I've seen some attribute cycling problems (failure to extract) to this very condition and I'm sure it's a contributor. Usually, what results in such a tight fit in the chamber is overall under sizing: if the shoulder wasn't hit hard enough to set it back enough then the case body may also not have been squeezed enough far enough down either. I don't know that a small base die is always the cure for all sizing issues, but one will sure put the kaibash on 99-percent of this happenstance.



This Dillon® .308 die is representative of most, in numbers. Out of its little blue box, it sized the neck o.d. down to 0.3300. Size an average Lake City case on this tool and the neck i.d. goes down to 0.3000, or a little less. The expander is 0.3065. That's brass abuse. It's not the worst I've seen. Better to do what I had done and open up the neck cylinder to 0.3350. All it gets used on is LC and similar. Sho made sizing worlds easier, cut down heaps on case stretch (length growth), and, yes, still sized the necks perfectly to hold bullets. It's my "M14 die" and I don't try to use it for anything else. Another outstanding die for this rifle is the Forster-Bonanza® "National Match" and Redding® has a small base sizer also.

Each round must enter the chamber freely. Any hitch in feeding or lock up, especially such as might be caused by an over-blown shoulder, is an invitation to an open bolt detonation at worst (more about this "quirk" in an associated installment) and inconsistent target performance at the least.

Use a cartridge headspace gage to set up this die! Don't even think about sizing another M14

Necessary for all, but slap faced foolish not to have a cartridge headspace gage for a 14. Something like this LE Wilson® will keep things safe but a Stoney Point® gage is the only one I'll ever use (see the book for details). It gives the same number a gunsmith uses, and "gives a number" helps immeasurably by itself. If you want to use a drop in gage, continue threading down the sizing die until the case drops to the bottom step, not the top, or until you run out of threads and the shellholder hits the bottom of the die. It's also possible to gauge progress based on where a new LC stops in your gage. Then start grinding on the die. I've seen dies that wouldn't hit the shoulder hard enough to move it where it needed to go. The shoulder has to get set back on these cases to at least 0.002 under chamber headspace, and another tick won't hurt. A small base body die from Redding® can be useful. It will size the body "down" and set the shoulder, but will not touch the neck. It can even come in handy if someone ends up with loaded rounds that won't chamber freely.

Yes

No

I read an article about how to reload for a 14 and it offered bogus, dangerous, and, therefore, irresponsible advice. Said to keep threading down the die and trying to chamber the round until the bolt closed on the case being sized. Two big problems, at least, with that. One is that LC brass sometimes needs two passes through to form to the die; continually sizing on the same case to do this little test means almost certainly that the next case sized with this die setting would remain larger. Another is that the bolt will, indeed, close on a case that just fits the chamber, but that's not it! Dang. Don't even do that for a bolt gun! That is the way many chamber a 14: using a hand turned reamer pulled in via a rod inserted through the muzzle. They stop when the bolt closes. That usually gives a headspace of 1.630. LC Match is usually 1.626. Set resized cartridge headspace to no longer than 1.628 and go on in a chamber cut like that one.

case until that's bought. The case shoulder usually needs hit hard. As for how hard, it's necessary to know where the case started both before and after firing. It really helps to know where the gunsmith set rifle headspace. Again, it's tough to know with certainty that the fired case reflects chamber dimension. Most new rounds show minimum dimensions and most chambers allow a little more than that. I think it's safe to add 0.002 to a read from a new LC case and go to work. Do not, however, crowd this dimension. A solid 0.002-0.003 shorter than the chamber adds a safety, and reliability, margin this rifle needs. Given its effect on brass in other areas, and given that these cases will not be sized very many times, "overworking" the brass through sizing is near the least of worries.

To make sizing easier, make sure the cases are clean. Take extra care in cleaning the insides and outsides of case necks, and use lubricant to

ease the neck. The right lubricant is, of course, Imperial® Sizing Die Wax, and it's what to use for the case body too. And another thing is press leverage. The more the better, and anyone routinely sizing for these guns best get something with a long handle.

Pains in the Neck

Even coffee-can brass needs a little tenderness.

The thicker neck walls of LC and equivalent are plain sized too much by standard dies. The case neck i.d., assuming the expander ball is used, will work out about the same for thin or thick neck walls, but the amount of compression and expansion the necks go through to get there is a difference.

Considering the thick neck walls and hard composition of an LC case, it gets an extremely elastic workout when run through a standard sizing die. It's common to have the case neck go down and up nearly 0.010, which LC resists through its hardness. Particulars to infer from are in another place, but to ease up the torture, have a good machinist (if anyone ever needs one of these folks, may as well get a good one) open up the neck on the sizing die. If the die is only to be used on LC or dimensionally identical other, get it opened enough that the expander can be removed entirely or, at most, just brushes the inside of the neck. There's more about expander balls and ways to treat them elsewhere, and that all helps too, but here is sure one time it's wise to go without one if possible. Potentials for inside sizing good are lighter than those for bad, this time. Case stretch may greatly lessen. I don't know of any small base dies produced that allow interchangeable neck bushings, but they sure can be made. [See "Sources & Acknowledgements" last thing in the book.]

Due some to the M14's treatment of brass and more to the sizing method recommended, it's normal to see a good deal of case growth, which means necessary trimming. Even with all the tricks I usually trimmed brass for my M14s each time it was fired. Sure, it could be trimmed back and go another load or two but always then saw a good deal of inconsistency in case lengths, so it got trimmed anyhow. As for what a trim-to length should be, most chambers will accept brass that's a little longer than the SAAMI minimum of 2.000, but how much is variable. I say either check it with a gage or stick with the minimum.

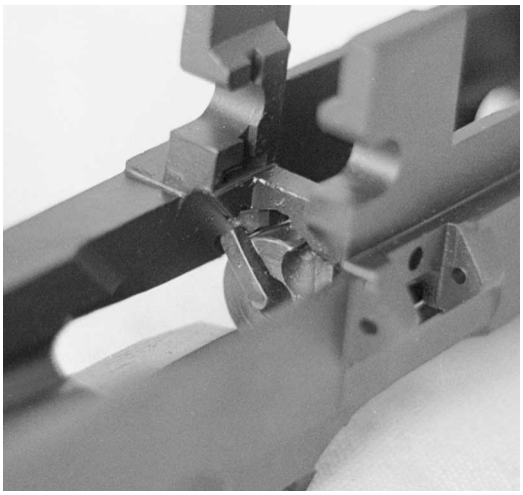
Make sure these case mouths are deburred inside and out and pretty heavily chamfered on the inside. The harder brass can work on the bullet jacket more than softer commercial case mouths might.

Aberrant Behavior
[look Ma, no trigger]

Before we talk about bullets, we first have to make sure they're going to launch when we intend them to.

The M14 can fire when its bolt is not fully locked down or in battery. The primary manifestation of this is the firing pin detonating a primer during forward bolt movement. Such an out of battery discharge is commonly known as a "slam fire," and anyone who has ever witnessed one will not want to see one again. The result is (usually) open bolt detonation, which can turn a round of ammunition into a grenade (the severity of its effect somewhat depends on the timeliness of the unintended eruption related to bolt closure progress).

[I need to make a distinction between an out of battery discharge and a slam fire. There are some such things as "in battery" slam fires as that simply describes one of the means by which ol smoky can rattle the rafters by firing without a trigger. Most often, a slam fire does occur before the bolt lugs are fully cammed over in place, which will immediately send the bolt backward. An out of battery discharge doesn't have to be the fault of an out of control firing pin, meaning that the primer



There is a bridge in the receiver that's supposed to "hook" the tail on the firing pin as the bolt is closing and prevent the pin from going forward, but that's only according to the blueprints. The tail of the firing pin then aligns with the bridge to allow the pin to go forward after the bolt is closed. It hardly ever works all the time and frequently doesn't work at all. Not all bridges are dimensionally correct enough to function as designed and can allow the pin to slip through as the bolt closes. Not a "quality" issue since it's known to infect the superb "real" M14 receivers as well as cast junk from China. If the bridge has too tight a tolerance, it can cause cycling malfunctions and possibly the destruction of the firing pin as it contacts the bridge when the bolt unlocks after firing. That condition is rare but could be one reason many receivers tend to come out a little larger in the bridge area.

can get popped intentionally, through a trigger pull, when the bolt isn't locked down when the shooter thinks it is. Keep reading...]

Normally, when the rifle won't go fully into battery, which usually means that the bolt starts to twist over but stops about a half to a quarter turn shy of its full rotation in to lock its lugs, the impact from the hammer will seat the bolt before the firing pin detonates the primer. Normally. Also, normally, this condition is ammunition induced. Specifically, the case somehow doesn't want to fit into the chamber. It's either too long, in its headspace dimension or its overall length, or the bullet is getting jammed into the rifling, or the case body is too big, or the chamber is too rough. Many choices, but something is preventing the round from chambering freely. I've seen ragged workmanship (either an incomp gunsmith or incomp parts maker) make the bolt run disorderly. It's common for a rifle to malfunction (not extract) if the bolt doesn't rotate closed fully before firing since the gas piston may not be parked where it needs to wait.

Anything that impedes cartridge progression fully and freely into the chamber opens the door for an out of battery firing. Case sizing is the best safeguard against out of battery mishaps, and small base sizing helps ensure slick chambering. This is again why setting back the case shoulder aplenty is important in this rifle. A bolt gun shooter can feel the extra resistance if there's a problem, but the gas gun shooter cannot.

The chamber should be scrubbed clean each match, and I don't mean casually patched out. Then use a rust preventative. Before then it should have been polished by the gunsmith. I know there are some who don't agree because they say this causes more stretch in brass under fire, and that doesn't seem like a good thing (not with what's already been gone on about regarding the disrespectful treatment M14s give a case). Here's the deal: if the rifle is spaced up tight there won't be much additional expansion in a smoother chamber, but it's going to blank a case in so few loadings that a little more stretch honestly doesn't matter. What does matter is making sure the rounds can get in and out of the chamber, and that's the polish effect. Don't lubricate the chamber, just polish it with 320 grit. That's not extreme, so don't look at it as such.

There are four ways to load an M14. My way and three wrong ways. Ha. My way, actually, won't hurt your bullets or getcha kilt. The safest method is to "thumb" a round fully into the magazine and then release the rod handle. This duplicates semi-auto function. Version two of that is favored by some old timey types and that is to ride the durn thing down all the way by hand and then bump the rod handle to seat the bolt. Go figure. Another method which better protects the bullet from damage and doesn't require any pushing or bumping is to poke a round fully into the chamber, unlatch the magazine, trip the bolt stop by lightly retracting the rod handle, and let the bolt zing on in. The magazine is relatched prior to firing the shot. My way, and the right way, is to do that but not let the bolt loose until easing it about halfway home. The key here is to shorten the distance the bolt has to develop excessive momentum. I never understood why everyone didn't load a 14 that way. No reason not to.

1. Poke a round into the chamber. 2. Unlatch the magazine. 3. Let the bolt halfway home and then release it. 4. Relatch the magazine.

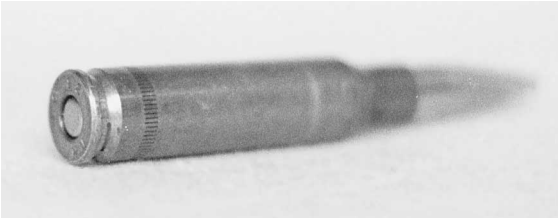
This round was chambered and withdrawn using the common slow fire loading tactic of unlatching the magazine and letting the bolt fly from a fully retracted position. That little dimpled chad there in the center of the primer that looks like a firing pin indentation is a firing pin indentation. A little more and it would have been a full on strike.

From a "broken gun" standpoint, the causes of a slam fire are just about limited to a bound firing pin, whether by grunge or burr. If there is something physically restricting its free movement to the rear, the pin turns into a battering ram with predictable results. Also, a worn firing pin often gets a hook turned up on the bridge, which can stick or stutter during the bolt cycle and cause a mis-timed impact. Check the "track" and the pin, and carefully inspect and test fit any new pin (everyone will go through a few in the course of owning an M14). The pin track area does not need lubrication (attracts grit). Chrome pins seem to hold up well and stay a little cleaner.

Sinking to New Depths

Loading bench slam fire cures are primarily primers.

First is choice. LC ammunition has a tough primer. The only commercially available primer I know of that's similar in construction is the tough skinned WW®. CCI® is hard aplenty too. There is greater insurance against a slam fire using either of these primers. The one that, I say (as well as did every single gunsmith I've asked) not to use is Federal®. It's "touchier." Remington® is okay, but not a positive step (in this direction). That's too bad because the Federal® can work well with other .308 W. loads. Honestly, it's a risk on an M14.



Make sure each primer is visibly below the case head. High primers are an annoyance and accuracy detractor in most guns, but they're downright dangerous when fed to an M14.

Uniforming primer pockets about guarantees no primer sitting flush with or above the plane of the case head, which won't guarantee no chance of a slam fire, but it won't hurt. A uniformed pocket is assurance of consistent and adequate depth to get the primer the necessary 0.004 or more under the plane of the case head (0.008 isn't too much). Use the tool in place of a primer pocket cleaner. Part two is making sure they're under the head. Run a finger across them; don't just look. Primers have a beveled edge so can look (around the edges) like they're seated below flush when the center of the primer is not. There is "plenty" of firing pin on an M14 to get to a submerged primer. The little extra distance, though, can make all the difference in safety. Pay particular attention to this using a progressive loading machine.

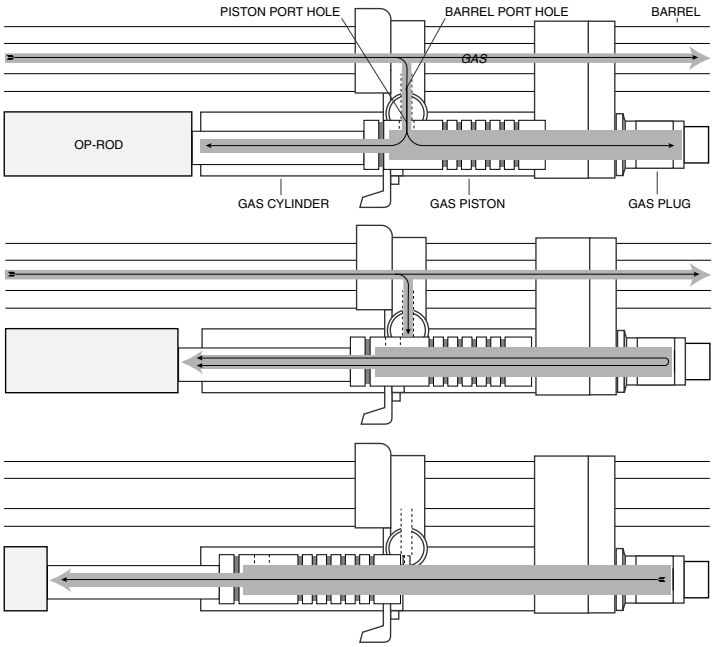
[So I don't worry: in the material in the book proper on seating primers, I talked about contact-plus to tension the anvil up against the pellet, a tactic that increases sensitivity of the primer. Don't attempt that loading for anything with a free-floating firing pin, if it worries you. It doesn't worry me since, again, it's primer construction and seating depth that has the most influence on primer contribution to this malady. Seat to the bottom of the pocket, so the anvil is in full contact at all contact points, and leave it at that.]

Powder and Port Pressure

Yet another safety issue: which propellant to use. (Yes, there is a time when everyone gets to just go shoot their rifle, coming soon.)

For the M14 to function as a self loader, gases from firing are bled into the gas cylinder from a port hole in the barrel; these gases are fed through a corresponding hole in the piston, which has a forward facing (into the cylinder) hollow end. When sufficient pressure has accumulated inside the cylinder, the piston moves rearward, the gas port inlet hole misaligns with that in the barrel and

The M14 has issues with port pressure, and the only issue of influence is knowing the upper limit on burning rate, which is a 4064. I think 4064 is borderline but don't think it will ever harm a rifle. Others purport to be right in the range but, VARGET®, for instance, is too slow despite what Hodgdon® says. Shoot some and it's plain. It hurts the rifle. IMR® 4895, Hodgdon® 4895, Accurate Arms® 2495 are, I think, the very best choices. These three are close to the same in burning rates, but I listed them from slowest to fastest. I like Hodgdon® the best and mostly because it meters very well. It also has the more temperature resistant coating akin to VARGET™.



shuts off the flow, and the action stroke commences. The piston butts up against the operating rod at rest (before firing) so that when the piston moves to the rear it moves the op rod back, which, being connected to the bolt, opens the bolt and cycles the action. Legions of linkage.

Design specs call for the vicinity of 12,000 psi port pressure. The level of pressure that exists when the majority of gas reaches the barrel port is port pressure. Staying within this figure is easy provided we know propellant burning rate rankings.

Port pressure is not the same as chamber pressure, nor are there direct corollaries: low chamber pressures do not necessarily mean low port pressures, and vice versa. Slow burning powders, which generally test to lower chamber pressures in .308 W., escalate port pressures to well above the limit for the M14. This has to do with the volume inside the barrel, which is increasing in front of the case as the bullet travels outward, and the amount of gas pressure behind the bullet during this journey, which can be greater with a "late blooming" powder. When port pressure exceeds specs, "blooms" at the port, the piston moves at excessive speed, which also moves back the op rod and bolt too quickly and forcibly. The gun gets battered or broken and the cases take that much more abuse due to faster unlocking of the bolt.

I don't know what port pressures are with all available gunpowders, but that doesn't matter as long as I know this: the burning rate that defines the upper limit is IMR® 4064. Use nothing slower. Ever.

This is not to say it's necessary to use a "fast" powder. Then the same standards apply here as for most everything else. Fast powders (like H322) can overblow chamber pressures before producing adequate velocity, or port pressure, in a .308 W. case. However, anyone who sneezes dust might remember that one of the all-time greats in

this use is IMR® 3031 at 39.5 grains (this was original in the original black and white boxed Federal® Match that shot so well).

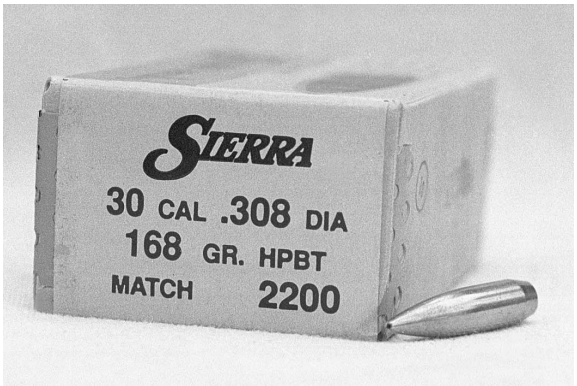
The time-proven performer in this rifle is one of the "4895s." There are at least three and all are suitable, even though they're not precisely the same.

The 4895s are excellent, flexible performers: there's a wide range of charge volumes that still produces top accuracy — just tune the speed. This, by the way, may be the only easy part of handloading for an M14: finding "the load" is not difficult. That's been done.

The more belligerent may continue to seek better fuels and I wish them well. A few like ball-type powders and a few more like the furrin stuff, and a few will continue to try whatever comes out next. As long as the powder stays within the stated burning range, use what is found to work best on target under the widest range of conditions.

And, speaking of that, avoid other problems by staying in the "upper middle" range with the load. Let's say that's 2550 fps at 70 degrees temperature with a 168gr bullet. That level won't cause problems when it's 100 degrees and it won't suffer getting to the target if it drops to 50. It's certainly (easily) possible to get more than 2550 fps from a 168gr bullet, but it can beat the gun.

One lesson I think most Service Rifle shooters learn, if they stay with this smoke pole long

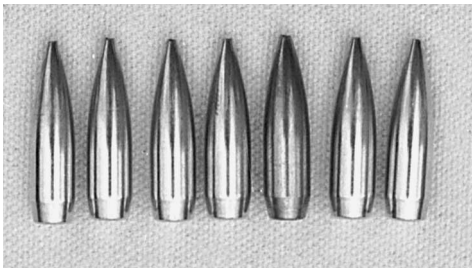


The staple M14 bullet was (still is, in a way) the Sierra® #2200. This 168gr bullet is the first to try: if this bullet doesn't shoot in your rifle, the weapon is cursed. More than I know anything else in life, stick 41.5gr H4895 in an IMI® case with a CCI® BR2™ primer and cap it with a #2200 to 2.800 inches oal. Done and done. Then go messing around with "better" bullets now that you have a sure thing to return to. Use 40.5 grains if you want. I did for 200 and 300.

The M14 can come on over to the dark side too. There are quite a few bullets better than the 168 Sierra® and one is the 175 Sierra®. It shoots with about the same ease but definitely flies better, and will stay supersonic at 1000 yards. Others are out there that fly better than that, like the 175gr vlds as offered by Berger® and JLK. These will work with a 1-10 twist barrel and won't overly tax the operating system.

[It's tough to get a 168 Sierra® to stay supersonic at 1000 yards through an M14. This is the reason, and the only reason, M118 outshot M852 at that distance, and also the reason most service teams went to a 190gr bullet. M118 is loaded with the otherwise so-so 173gr fmj LC bullet; it flies better than the #2200. The Sierra® 175 will stay supersonic, or should, at 1000, and any of the vlds easily will.]

Various 155gr bullets work well and do take some buck from the big boy. The Berger® 155gr LTB ("length tolerance bullet") was designed for short line. This bullet has a friendly nosecone profile which approximates that of a Sierra® 168 but jumps considerably more to the lands than a MatchKing™ loaded to the same specs (which is to fit the magazine). Even with the extra speed possible, it also doesn't fly as well as the heavier Sierra®, but that's not that much issue at 200 yards. It shoots very well.

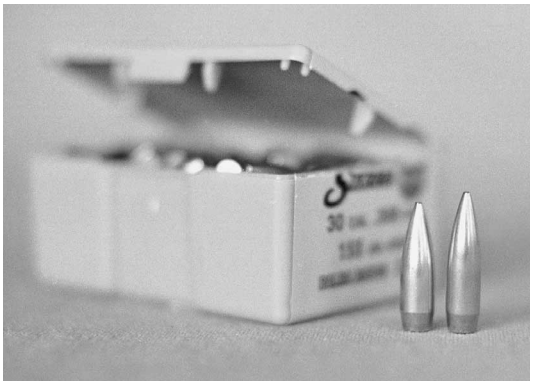


Quick! Pick out the Sierra® 168. Okay, it's the darker one third in from the right, but the Berger® 155gr LTBs surrounding it are a reasonable facsimile (with the difference being they kick less, and cost mo).

The Berger® 155gr vld is better at 600 yards than the#2200 by virtues of a higher ballistic coefficient and higher speed. This bullet can be shot from the magazine but its spikey profile, like all vlds, really needs to get on the lands to work, and jump is a Kneivel-like undertaking at magazine length.

enough, is the great importance of predictability. Wind performance, meaning how much correction is on the rear sight in a given breeze, is always important, but it's not everything. Attempting to reduce wind drift at 600 by upping the velocity on a 168gr bullet is penny wise and pound foolish, assuming that velocity is already in the 2500+ range. Any drift chart shows that another 50 fps doesn't make a bit of difference at 600 (qualified by saying that it's well under the value of a sight click). Bullet choice matters more to wind drift performance, and if that's a concern try one of the 175gr vlds. Push it to 2500 fps or so and there will be a difference that can be measured at the rear sight knob. Accuracy matters most to wind drift performance, in use.

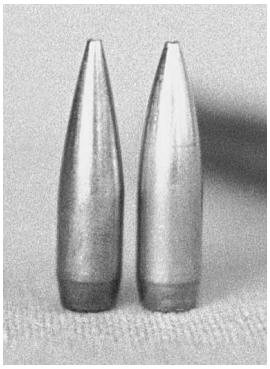
As said, one standard for M14 match ammunition is Lake City M852. Even though we don't have to draw ammunition any more at NBPRP events, many of the good gunsmiths from habit still engineer their work around this round. I think a handload that duplicates M852 still better be in



The Sierra® "Palma®" bullet, another 155, works just fine too, but is more in the vein of a low drag style design and, as such, tends not to shoot that well loaded to fit the magazine.

the notebook. So before anyone accuses me of living in the past here, one reason I still look at the 168 as a standard is because of what we know about it. I don't think there's a better documented bullet-round combination. Even though there are better bullets to use and it can be beaten, a standard, by standard definition, can still be the 168, and may always be.

With most calibers, the bigger the bullet the better it flies on down the pike. But there's a limitation to what the M14 will endure. This gets back to the pressure issue, and I think the realistic cutoff for the M14 is about 175 grains. Some of the service teams have used 190gr bullets with great success for long range events, but there are frequently gas piston, chamber, and spring modifications, along with faster twist barrels, done to allow it. I'd keep the 190s away from any M14 I had to pay for. The 173gr



What could be the best combination for the 14 are the Berger® 168s. LTB on the left and vld on the right. Proven weight for the system and daggone good downrange performance. This 168 vld will beat a Sierra® 175. Throw in some LTB 155s for short line and suddenly you, too, can be experiencing all the wonderful complexity that can beset smaller caliber shooters. Actually, it works really well.

If you want to skip all this mess, make up some "Mexican Match" using Lake City Match M118 (that which "falls off the back of the truck" is sometimes available at gun shows, and sometimes "Special Ball" turns up carried in by men in sunglasses). Pull the 173gr bullets and replace with a commercial 168. First seat the original bullets a little deeper to break the seal (you'll hear a "pop"); this keeps pulling the bullets from stretching the case as much. You may or may not to resize necks, but check by gently pushing a bullet tip agin some wood; it shouldn't move deeper. [See the "Pinching" bit in a bit.] This stuff shoots! Mex match is roughly equivalent to LCM852.

Here's how I do it, left to right: 1. Seat the bullets a little deeper using a gv seater ("garden variety") like this Dillon®; that's because it takes a fair amount of pressure to break the adhesive seal and no need to use the "good" one if there's another handy. 2. Pull the bullet using, well, a bullet puller. These are Forster® and the clamping-collet treats the bullets nicer than the "speed" puller next to it, which is indeed faster. 3. Seat a new 168gr tangent ogive bullet [what some might call a Sierra®] to an oal of 2.800 using a "good" seater. 4. For security's sake, in the head if not in the need, put a few thousandths worth of pinch back around the neck using only a Dillon® specialty die. It's a very good tool and standout superior to any of the "taper crimp" dies. 5. Done.

bullet in M118 never hurt a thing.

There's really no place here to get into gas system modifications that are possible on the 14, but a knowledgeable gunsmith can alter the "off" side of the spindle valve and reinstall it. Done right, the rifle will be much nicer to cases and a little more tolerant of somewhat slower propellants, and digest 190s without ralphing. I know of others who modify pistons, but that doesn't work as well.

One caution that doesn't matter often, but can, is that what I call bullet "exit timing" has to happen before the gas system starts to work. As quick as the flow goes in this rifle it is possible to get piston movement while the bullet is still in the bore. I'm not sure about the velocity that defines the lower end, but do know that it's one source of elevation shots on target. It's also a big, big reason that this system needs to be kept clean and should be cleaned each time out. Lower volume available to the system such as can result from buildup will increase the likelihood of premature operation. Again, elevation shots are the symptom.

Pinching
[maybe, maybe not]

Anyone familiar with Dillon® presses knows about their use of a last-station die designed to snug up the tippy top of a case neck. In sets made for semi-automatic pistol cartridges, this is called a "taper crimp" die and, mostly, irons out the mouth bell added for the bullet seating operation. Dillon® die sets intended for use in a semi-automatic rifle come with a last-step die that, in effect, functions the same but is a little different. This die [shown in the photo that accompanies the mex-match detail] has a neck area 0.002 undersized from what the Dillon® f-l sizing die produces. The walls are parallel rather than tapered which does not alter the form of the neck. Run the die down until whatever amount of the neck you wish is constricted, and the less the better. It's a visual process more than measured, but no more than a sixteenth inch should be necessary. Do the bullet tip to benchtop test and see how easily the bullet can be scooted back into the case.

I used this die on mex-match without seeing any negative effect on accuracy, and it's sure easy to work with. It may even help the consistency of the product due to variances in different ammo lots. This, by the way, is in no way a recommendation of crimping handloaded ammunition — in any way, shape, or form. It is only to say that in the isolated and unique product of mex-match, which could be called remanufactured ammunition, this die has a safety and performance function. I don't think it's a bad idea to have one of these dies around if anyone ever pulls and then reseats bullets. It's a little easier than resizing case necks.

This can also be fairly well duplicated given a neck sizing bushing of the right calculated diameter, which can be less than the 0.002 Dillon® uses.

I'm sure some remember the magazine ad war between Lee® and Redding® over Richard Lee's claim that his Factory-Crimp™ die is the "secret" to good ammunition and Redding® saying that crimping destroys accuracy. One was right, wrong, or at least nearer to one side of the truth in this debate. Who knows? Who cares? There is no need to crimp the necks of any round loaded in accordance with the techniques and tools suggested in this book. Whether or not poor ammunition could be helped or hurt by crimping doesn't matter to a handloader, and, beyond that debate, we're not really that impressed with factory ammunition — if we were we wouldn't be able to beat it so easily.

M1 Corollaries

Hope no one thought I had forgotten the big "big" gun. As this is getting finished there is a wave of interest in the Garand and I'd like to see it continue. Wonderful rifles and, like most everyone, it was my first experience with High Power. They still kick too much. Some things never change.

Much, and maybe most, of what was said

about loading for the M14 applies to the M1. Same thing on the caution against anything slower burning than 4064. The M1 uses an impulse gas system (no piston) and can get bent, cracked, and broken with a box full of "deer loads" (man, have I seen and heard that one) innocuously deshelved on the way to the range to try out the brand new old rifle that just came special delivery from the postman. Nothing (under no circumstance) slower burning than 4064.

M1s don't like brass much, but they don't hate it as bad as an M14 does. Still, same "four load" rule applies to the Garand.

Loads that work really well are with the same 4895 and LC cases; go to 45 grains with a 168 grain bullet. Most M1s, for some reason, really like a Sierra® 180gr MatchKing™; drop that load to 43gr. Also the same: IMI® cases are great; WW® commercial are the best of their type ("quality" commercial cases for them that wants it).

Slam fires are a big time routine on M1s. One reason is the big time bolt and the big time distance it travels to get home. Probably the slam-firingingest weapon there is is a Garand chambered in .308 W. Here now is a huge bolt running down behind a helpless and cringing shorter case. More weight and more room to run means the net effect is more potential to get enough firing pin inertia to ignite a primer. Man does it ever happen. Again, all other cautions on loading, components, and whatever else I said about it, should apply to the M1 straight up.

Big, big (or can be) differences in DCM type issue rifles and what a gunsmith will do on a custom barrel. Pay attention. Get tools.

Erosion Gages
[perfectly good barrels]

As a favor, I hope to think, to all the armorers manning the trucks at Camp Perry and all the gunsmiths who ever assembled an M1A™ for a customer, I put this in here. For anyone who owns one of those GI "throat erosion gages" for .30 calibers, please pay attention to this: it's only a tapered dealie with some lines on it. It is not a barrel life indicator, gunsmith competence indicator, or magic wand. It's just a tapered dealie with lines on it. The idea behind that gage was to do field checks on issue (rack grade) barrels to determine the amount of wear on the throat. The effectiveness of that gage on any barrel is questionable at best, and at the least cannot be relied on do more than it can do which is, again, indicate. It "works" with a gumment spec barrel: the gage should go into a new barrel and stop on the first line. Each line is supposed to equal 0.001 inches.

John Holliger, best AR15 Service Rifle builder I know (I use him), has a chamber gage for that rifle sale that works slick and easy. It's patterned after the .30-cal gage discussed in the text, but is for .223 Remington and turned out for custom chambers in our target rifles. John stresses, just like I did, that the proper and intended use of this gage is as a reference. It doesn't, in itself, indicate anything on first insertion. Make a note of where it stops and then see where it progresses as the rounds stack up. Each line is 0.001 inch, or so, equivalent of throat erosion.

Here's the trick: a custom barreled rifle, or anything that's not a GI barrel, won't sync up to that gage, or it's only luck if it does. Land diameters, throating tactics, and leades account for variations in where the gage might stop on any other

barrel, at any other time. There's nothing at all wrong with using a gage, but the mistake is in misinterpreting what it says. I've had gunsmiths tell me about customers calling back with an ear full of harsh words over what the gunsmith had "done" to their barrels, and, of course, the culprit was that GI throat erosion gage showing "4" on their brand new barrel. Calm down, take that "4" and call it "0" and then commence with the readings at timely intervals. It still may not be showing much since there are pertinent differences, or should be, in GI and custom chamberings, but then it's a reference.

This is getting pretty far from the scope of this book, but a collateral incidence is the use of a headspace gage set as also sold through many of the surplus outlets. The "GO" and "NO-GO" gages don't mean a thing, to us, in that their function is checking purely for functional latitude in an "assembly line" circumstance. They are not, nor were they intended to be, tools that definitively indicate headspace. They are arbitrary standards, and the standards are different depending on who and what for the gages are made to suit.