

On-Site Ammo

[transporting success]

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ORIGIN: This is an article, with updates, I've yet to have published. Hope you get something from it.

Any serious shooter using the AR15 as a competition rifle will do a whopping lot of load development. New bullets, new barrels, new propellants, harebrained schemes, and so on, mean that load experiments can be an ongoing process for the .223 shooter.

There can be big differences in AR15 chambers and rifle specifications. There are also demonstrably significant differences in reloading components. There, therefore, is no fully reliable reloading data. Given insufficient information attached to available data (much of it comes from someone's tailgate rather than structured research), a lot of sure-fire combinations we'll hear about won't fire surely. I got tired of bringing home half-empty boxes of loser loads from range testing. And it was taking way too much time; I have a good two-hour round trip to get the next batch on target, not to mention load work at the bench between trips.

My solution came from Benchrest shooters. These folks load their ammunition right at the range, often on the very bench they're shooting from. They do this by reason of tuning loads for the needs of the day, and are able to because of the condition of their spent brass and loading tool requirements. I now take boxes full of primed brass,

a powder meter, a chronograph, bullets for the test, and a seating die. That's it. Oh, and a notebook (no kidding) and some targets.

Seating Die

Since Benchrest gave me the notion, it was there I did my first tool shopping. I ordered an LE Wilson "hand die" to seat bullets and added a Sinclair International micrometer top to it to allow precise indexing of seating depth. This seater style is an "in-line" design and provides dead straight results. It works very well, but to further reduce my "homework," I eventually replaced the hand die and arbor press with a teeny Lee threaded press that could hold my usual 7/8-14 seaters. I c-clamp the press to the nearest convenient work surface. Using a top-notch 7/8-14 seater, any difference in loaded round quality was measurably non-existent. I replace the

press shell holder retaining clip with an appropriate sized o-ring, and that works wonders. I do that on all my presses.

Powder Meter

The right meter provides a means for incremental propellant work ups and powder transport. Few meters have all the attributes needed to provide the most efficient use at the range. I use a Harrell's Deluxe (same I use at home) but no one honestly needs that "much" meter for development. There are less expensive alternatives (also provided by Harrell's) that no one won't like. Metering accuracy is likewise outstanding in a Harrell's and that, of course, is the primary function of a propellant dispensing device. You have to be able



Try them all! In one afternoon. Portable equipment makes it really easy to run loading experiments, or load tuning, in the same way. Change bullet seating depths, primer brands, or so on, and see – right then – what's working better. Prepare for the test before you go and you'll come home with a winner.

When I wanted to load at the range, the first obvious option was a genuine Benchrest shooter's loading setup. Primarily that's a "hand die" for bullet seating. It's simple, and precise. Lift the die body off its base, place a charged case with bullet on the base, replace the die body over the case (this elevates the seating stem in the top of the die), and then depress the plunger to seat a bullet. This is an LE Wilson with a Sinclair International micrometer top. It's shown here sitting in a Sinclair arbor press, a compact tool assembled of well executed pieces of metal.



I ended up going with a Lee 7/8-14 "Reloader" press. It's cheap, easy, and it works. After transferring settings between range and shop enough times, I eventually decided to use the Lee press/seater hookup for keeps. It's very handy never to need to reset dies or otherwise readjust tools to produce duplicates. If you're going to try different bullets and seating depths will change from test to test, it's imperative to choose a die with an indexable micrometer top. Redding, Custom Products, and Forster all make excellent and reliable seaters. This is a Custom Products. Here's how I made the base. Wharn't hard, just took a little meandering in the fasteners section at a hardware store.



Make a base, add the tools, and clamp the base to the bench.

is that we're not (or sure shouldn't be) pushing the absolute limit on propellant charge. Another is that a propellant showing undue sensitivity should be avoided all together. Considering the accuracy of a truly good

to count on it, and also count back on it... All Harrell's use a precision Culver dispensing drum that clicks from stop to stop, have thread-on powder bottles, and a built-in clamp. Those attributes define how well you'll get along with your meter at the range.

The reason a Culver device is important is because it's reliable, which means repeatable. To clarify, a Culver (named for Homer Culver) is a design or style of metering device; Harrell's is one manufacturer of it, along with others, such as Custom Products. Culver adjustments click just like a match rifle's rear sight. Click the knob to a setting, then click it elsewhere, and then click it back, and you (absolutely) have the same setting you started with. You can come home and duplicate any charge tried at the range -- click right to it. And if you know your meter throws a tenth and a half of VARGET per click, for instance, then you have a very good idea how many clicks to go up after the first run of rounds downrange. I record clicks and worry about correlating weight later. Other dispensing designs may have micrometer-style arms, but without the click function, adjusting to a new index is not nearly as precise.

I transport propellants for the day's testing in the meter bottles (most meters have a fixed hopper). The bottles have a threaded cap (the same as on a one-pound Hodgdon powder bottle). Remove the bottle cap, invert the meter, and thread on the bottle. To switch propellants, invert the meter, unscrew the bottle, and replace it with another bottle.

I mentioned the tenth-and-a-half increment in VARGET, and that sort of thing is crucial to know. Preparation is the key. The way I confirm a meter setting and then plot out its increments (plus, of course, confirming its accuracy) is by weighing 10-throw pans on my scale (scale set to 10 times charge weight). There's no question in my mind that you'll get a more accurate meter setting by consolidating 10 throws into one pan rather than by weighing 10 separate throws. Done enough times using enough different setting changes you'll get a very accurate assessment of the weight value of a single click of each propellant you use. Take time to sort your meter and you'll save that time back in spades when you take your show on the road.

Why not weigh charges and be exact? Well, outdoors is not a good environment for a scale. It can be somewhat protected from environmental influences, but it's tedious in use and, in my opinion, of little significance to the outcome of a test decision. One reason

I use a Harrell's meter. Its top function-factor is its precision-made "Culver" dispensing drum apparatus. Harrell's calls it a "Clicks-On," and that reflects the question from Benchrest shooters: "How many clicks do you have on..." Right, they're using the same propellants, same Culver metering devices, and they're not weighing charges. It is exceedingly important to have taken the time to triple-check and record the value of a click for any propellant you use.



My meter is fitted with a few add-ons from Sinclair that can't be gotten along without. One is the stand. This meter has a clamp but I like the height adjustment in the stand.

Another is the best powder drop tube I've seen (plug-in caliber-specific inserts). Sinclair makes powder bottle adapters for Redding meters, as well as the drop tubes and clamping stand. That's a dryer sheet banded to the bottle (no static electricity). Another is a meter bag. It protects the meter during transport and shades it at the range.



a process that wasn't anticipated before leaving for the range that day. I've seen times when moving the bullet away from the lands was making the best show, for instance, and this is something I wouldn't anticipate or assemble if I was limited to using home-done ammunition for a range test. Use your imagination, answer your own questions.

Process

The process I follow varies with the goal, but if it's a fresh development I usually load and fire three samples when I'm at a brand new combination just to get an idea of tangibles like bullet velocity. I'll then go up however many clicks I deem reasonable based on the results of those three rounds and try three more. If something looks just awful early on, I'll stop and move on to something else. I know that three rounds is hardly a test, but if it looks bad on that few, it's not going to get any better. When velocity is in the ballpark I anticipate attaining (say, within 100 feet per second) and things get all happy looking, round count increases. All rounds go into a target and the sight setting never changes. I'm even putting the low-end loads on the same target because I'm hoping I'll see that "sweet spot" propellant that doesn't shift elevation with small increases or decreases in powder charge. Group size is always leading me toward or away from more experimentation with one propellant. Eventually it gets to 10-15 round comparisons of the better two or three, and ultimately any decisions are confirmed at another day using ammo I assembled in a larger quantity at home. I always clean the barrel when I switch bullet brands or propellants, and that equipment is also totable.



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Important!

I do load work ups with sized and primed once- or twice-fired cases when I'm going to start low and then increase propellant charge. The reason is that a new case fired with a light load should not be reused later to contain a hotter load. Brass fire forms, no matter what, when it's fired the first time. How it forms depends somewhat on how much expansion and bolt thrust it endures. Always fire form using your "normal" velocity load (which may or may not be "maximum"). I

use new cases to do tuning work after hitting "normal" velocities in earlier testing. Remember: you can load a used case down but not up from what it first fired.

Chronograph every test round you fire. Of utmost importance (read this and heed it, please) is not to trust memory for any more time than it takes to take the cap off a pen. When you find a load that seems to be working, just load up two more and carry them back with you. Those are your backups. Write on them with a Sharpie.

SOURCES

Sinclair International
www.sinclairintl.com

Redding
www.reddingreloading.com

Lee Precision Inc.
www.leeprecision.com

Forster Products Inc.
www.forsterproducts.com

Custom Products
www.neiljones.com



Working Up

If you're doing a high-pressure work up with the idea to get maximum velocity, here's the best way I know how: take a sizing die along with (threaded into another little Lee press), some case lube, a cleaning rag, and a hand priming tool. After you have gone up the velocity ramp from starting load to something you believe is nearing max, switch to new cases. The idea is to size and reuse the same cases as you search for the upper limits. Gauge pressure based on the feel of re-seating primers. This is the most reliable means I've found to judge the pressures that exist in a load. You're also watching the chronograph, but if primers are getting really easy to seat after two or three uses of the same case with the same charge, then you best back off and get happy with a slower bullet. Measuring case head expansion is, of course, another way to see much of the same thing, but primer pocket expansion is the direct effect and most telling clue.

Badda-bing, badda-boom. Start low, dump charges, seat bullets, shoot, look, and ponder. After adequate pondering, turn up the volume on the meter one or more clicks, lather, rinse, and repeat. Keep doing that. Eventually you'll find something you like, and you'll know it's not too much or too little of anything. Lookee what I found in the lower right hand corner of the box – a little more of everything. Glad I didn't load a box or two of those... Put all the cases back in order for even more reliable future study. I use once or more fired brass when I start with a low powder charge and new brass for load development after nearing max velocities, and that's so I can check next-time primer seating for pressure clues.

And! For chrissakes, if you find anything write it down! Even write down what you don't find. Don't trust your memory. This is a fact-finding adventure, after all, and it sho can be an adventure. Document it.

There's a lottamo in Handloading For Competition...