

LONG-RANGE SHOOTING SPECIAL!

**FBI SNIPER
RIFLES**

EVOLUTION OF THE
BUREAU'S FIREPOWER

GunDigest

WE KNOW GUNS SO YOU KNOW GUNS

THE MAGAZINE

AUGUST 15, 2018
VOLUME 35 • ISSUE 11



**BDC
RETICLES**
"C" DOES NOT
MEAN "CONFUSING!"

**GO LONG
OR GO
HOME**

- ARE YOUR CUSTOM GUNS WORTH THE COST?
- THE VERSATILITY OF THE .224 VALKYRIE
- PROOF RESEARCH'S NEW SWITCH-BARREL LONG-RANGER
- RUGER'S NEW DISTANCE-STRETCHING HUNTER
- DOPE DISCONNECT: TROUBLESHOOTING BALLISTIC APP DATA

MULTI-GEN PRECISION
KIMBER'S ADVANCED TACTICAL SERIES

knew right from the start that Ken was trying to prove a point, but I was curious just how far he was willing to push this little “test” he had organized.

Ken Hagen had me stretched prone at the heel of a new H&H Precision custom build he’d recently completed, and before me lay a myriad of targets — each at exponentially increasing distances — scattered across the foothills of the Pacific’s Northwest’s Mt. Olympus. This rifle, built on a platform of black, was short and stout and chiseled for mid-range service duty. Everything about the

gun screamed “urban tactical,” and it nearly felt out of place next to the other precision rifles stretch out on either side along the shooting line.

As any rifleman knows, barrel length increases velocities, promoting accuracy at extended distances. That’s as much common knowledge as is the fact that the pointy end of a rifle cartridge goes forward when loading. But according to Hagen, increased barrel length can also be used as a crutch when other components of a rifle are, um ... lacking.

And to prove his point, Ken intended to have me work over a 1,270-

yard target with this .308 — a .308 Win. that sported a 16-inch barrel. And again, as nearly every rifleman knows, the .308 Win. has long been the standard upon which long-range ballistics have been applied. But the 16-inch barrel on a long-range bolt rifle? That’s a little less standard.

I began familiarizing myself with the rifle’s intricacies with some “gimme” shots at 550 yards on a 12-inch steel plate. As expected from a top-end custom rifle, every shot became slightly more additive than the one prior. I’ve heard gun writers refer to working a bolt as “effortless,” but

DEFINING 'CUSTOM'

Is the extra money a custom gun builder demands really worth it? Here’s what it take to guarantee 1/4-MOA accuracy. ■ **LUKE HARTLE**

PHOTOS BY TRACER X





From bolt to muzzle, each component of an H&H Precision barreled action is held to scrupulous tolerances.



“I’ve heard gun writers refer to working a bolt as ‘effortless,’ but this was different: It seemed impossible that two pieces of metal could work in unison with such grace.”

this was different: It seemed impossible that two pieces of metal could work in unison with such grace. Once that target was thoroughly demoralized, I stopped to send a handful of rounds at a 725-yard target before settling the crosshairs on the clean white paint of the 1,270-yard gong.

My first shot sailed just wide of the gong — a misinterpreted wind call on my part that was embellished by Ken’s beady eyes piercing my concentration from over my shoulder. This was the test he was determined to have me pass with his rifle, and I’d allowed my concentration to drift away from the fundamentals ... which allowed the bullet to drift away from the intended impact point.

I resettled on the gun, ran a quick mental diagnostic of my body position and waited on the wind call. At

the rifle's report, I had time to properly follow through and still get back on target to watch the paint splatter from the collision — a bullet that drops more than 4 stories out of the air will do that for ya. On the heels of that visual verification, I ran the bolt and sent another, and another ... and another. And by the time the magazine ran dry, that 1,270-yard white steel plate looked like the cap of a pepper shaker.

For years, Ken has built the H&H Precision brand upon the guarantee that any rifle purchased from him is capable of shooting ¼ MOA. And that's a bold stance in an industry that hangs its hat on producing MOA-guaranteed rifles every day of the week.

The Custom Touch

When I was a kid, Grandma always made the best cookies. Mom's cookies were fine and Auntie did a decent job, too — but none were close to the quality of what Grandma could whip up. Of course, when I inquired to the reasoning behind this phenomenon, I was always told that Granny's cookies taste best because "they were made with love."

I could tell you that Ken Hagen can build a gun on a ¼-MOA guarantee because of the love he incorporates into the gun, but that implies a bit of magic, and the detailed machining work done at H&H Precision is much more surgical in nature.

We've all heard the tale of two friends who walked into the sporting goods store and bought the exact same rifle on the exact same day — but at

the range, those two "identical" rifles behave nothing alike when scores are tallied on the target. So, what gives?

Stacking Tolerances

Like a chain, any rifle in question is only as accurate as its weakest link. Parts are milled, machined and fitted to a specific set of tolerance parameters. The more finite the tolerances, the better each link in the rifle chain works with the other links.

For example, let's say that when Rifle A was built, the barrel-to-receiver threading was off by one-thousandth of an inch. In reality, that's a pretty small number and it falls within the tolerance allotment determined by the manufacturing company of Rifle A. Let's also say that the bolt face is one-thousandth of an inch out of alignment with the front of the receiver, as is the shoulder

of the muzzle brake when secured to the business end of the barrel.

Keep in mind that all metal is malleable, and it's very possible to overcome that tiny one-thousandth of an inch by tightening the barrel threads with enough force that the barrel's shoulder aligns perfectly with the front of the receiver. After all, no one is going to buy a gun that wears a tiny gap between the barrel shoulder and the receiver.

However, that "force fitting" has just introduced stress into that rifle. Compound that with the stress it takes to perfectly align the muzzle brake — or any other similar components — thus building stress into that entire barreled action. Forcing the pieces to fit takes advantage of that malleable metal, and it stacks one tolerance deviation on another.

Stress plus heat (as introduced to the barrel by rapid, consecutive shots) equals barrel walking. Simply put, metal stress is what causes bullets to string out as the barrel heats up.

And that's why those two identical guns I referenced earlier have the



potential to perform so differently: Sometimes, luck has it that everything lines up and a particular gun is nearly stress free — and it drives tacks. Sometimes, luck swings the other way.

Eliminating stress is all but impossible, but Hagen takes the extra time to trim his tolerances down to the ten-thousandth decimal place in an exhausting effort to minimize the stress incorporated to the build. A rifle with no stress will not walk as the barrel heats, and it's also the foundation upon which a ¼-MOA guarantee is built.

Bolt And Receiver Truing

As we started working up a rifle in Hagen's shop, it's was almost aggravating to watch and wait as Ken measured and re-measured the bolt face and the bolt head against the front of the receiver, but I knew well

what he was doing: It's impossible to achieve exceptional accuracy from a rifle whose bolt doesn't perfectly align with its receiver. There was no guesswork here: It had to be checked and cycled — and then checked again — and then check and cycled again to confirm complete compatibility.



Barrel Timing

After a day in the H&H Precision shop, it's impossible for me to view a barrel as anything but an elbow macaroni noodle. Yes, elbow macaroni. According to Hagen, every single bore in every single barrel that's ever been made has a curve to it. Sure, the macaroni analogy is a bit extreme, but when a rifle bore is drilled, it's impossible to keep the resulting hole from developing a rainbow-like arc to it inside a perfectly straight barrel (according to outside dimensions), regardless of how slight.

So, how is that overcome? It's not — but it is accounted for. Hagen implements a series of surgical steps that help him determine the exact path of the bore curve, and he then aligns the barrel with the receiver so that the curve always points exactly straight up at the muzzle ... like an inverted rainbow, if you will. This helps minimize bullet drop from line-of-sight and keeps bullet travel perfectly aligned with line-of sight as well.

"Imagine if that curve were spitting bullets up and right," said Hagen. "Have fun tracking with that rifle."

Built From The Bore Out

Just as barrel timing references the curvature of a barrel's bore, Hagen references the bore for every other piece of machining (truing the barrel shoulder, cutting the barrel threads, truing the muzzle) — never the exterior of the barrel.

THE BENCHMARK IN BARRELS

As with his receivers, Hagen is meticulous when it comes to selecting the components he works into his custom builds. And because the foundation of an H&H Precision rifle is built round the bore, it's arguable that the barrel blank is the most important piece. His choice: Benchmark Barrels.

While studying with Hagen at H&H, we took a day to spend some time understanding the differences between what it takes to make a good barrel, and what it takes to make a great barrel. And although I was sworn to secrecy on a lot of the processes that Benchmark implements, it quickly became obvious that their attention to the details that most machinists overlook is what helps them achieve a product that most can only hope to attain. They're a lot H&H Precision in that way.

But amid the surgical-like processes is woven a bit of magic: the hand-lapping of the bores. There are no machines that can be tuned fine enough to mirror the learned craft those hand-lappers were practicing. And a job that's done "by feel" is something that's not easily replicated by competition.

—Luke Hartle

(left) Law enforcement municipalities along the entire coast of Washington State have started shooting H&H Precision rifles exclusively.

(right) This H&H Precision build features a Killer Innovations Orias chassis and a Benchmark barrel.





“Stacking tolerances” refers to compounding deviations when assembling machined parts. True long-range accuracy demands meticulous machining practices.

THE GUNS OF H&H PRECISION



Located just outside of Seattle, Ken Hagen of H&H Precision has been building his brand one rifle at a time in the foothills to Mt. Rainier — country perfectly made for testing the art of precision rifle building.

Though not yet a household name, H&H Precision has silently landed contracts with all the major law enforcement municipalities of the Washington coast — and those guys are damn picky about what they choose to shoulder when lives are on the line.

The .308 Win. sporting a 16-inch barrel is a new build for Hagen, custom designed to meet the demands of his growing law enforcement clientele. Still, the H&H menu has an abundance of chassis and hunting models upon which the consumer can build. The rifles don't come cheap — but then again, hand building each and every rifle to ¼-MOA spec does take time and talent.

—Luke Hartle

Think about that for just a moment: If a gun is built so that the barrel is perfectly aligned with the receiver instead of the bore being perfectly aligned with the receiver, the chambered cartridge is likely out of alignment with the bore from the very beginning of the shot cycle. This adds more stress to the system, and we already know what that does to accuracy.

As Ken explained the process to me, it almost made me squeamish that many of the concepts he was explaining were so obvious — and apparently he was able to ready that on my face.

“I’m not saying I’m doing the impossible here,” Hagen said. “I’m simply saying that I’m doing things and attending to details that most rifle manufacturers — big and small — don’t do. You can buy a \$1,200 precision rifle that shoots well; there are plenty out there under a lot of different brands. H&H Precision is all about the shooter who appreciates what it takes to achieve ¼-MOA accuracy and understands what a gun like that is capable of doing at long ranges.” **GDTM**



ESP STEALTH MODEL

HEAR EVERYTHING

WITH ESP'S CUSTOM-FIT DIGITAL HEARING PROTECTION DEVICES

WITH P2i[®] WATERPROOF NANO-COATING TECHNOLOGY



303-659-8844 www.espamerica.com

esp Electronic Shooters Protection