

ONE Serious TOOL

By Dick Metcalf, Executive Technical Editor



Less than five minutes after opening the Borescope case, the author had already discovered small rust pits and copper fouling in one of his favorite Contender barrels—which he had just cleaned.

Gradient's Hawkeye Borescope lets you see the nitty-gritty of a firearm's bore, and that can save you money and help keep your guns shooting their best.

If you've never used a Gradient Lens Corp. Hawkeye Borescope to look at the inside of one of your rifle, handgun, or shotgun barrels, you're in for a revelation. I don't care how scrupulously you maintain your guns. I don't care how often

or how thoroughly you clean their bores (or how thoroughly you *think* you clean them). You have no idea what they really look like in there. I only wish I'd had one of these devices when I was first getting serious about guns and shooting about 50

years ago. I'd have saved myself a *lot* of money since. I'd have ruined a lot fewer good guns through ignorance and inadvertent neglect. I'd still have a lot of those good guns instead of having gotten rid of them because they "went bad" on me for reasons

I didn't fully understand. And I'm sorry now about the guys who took them off my hands.

The Hawkeye Borescope is a very simple but very high-tech device. It lets you examine the inside of every millimeter of your gun's bore with a handy, self-lighted "microscope." It is ridiculously easy to use. Gradient's basic Hawkeye Slim 17-inch Shooting Edition Borescope Kit includes a Hawkeye Borescope with focusing eyepiece, Mini-Maglite light source and batteries, Mirror Tube, and lens cleaning supplies in a fitted lockable metal case. The standard kit lens tube outside diameter is 0.165 inch; the mirror tube outside diameter is 0.188 inch. Gradient's MSRP for the kit is \$895. Real-world price is currently \$773.95 from Brownells-Sinclair.

Worth Every Dime

Yes, that's as much as or more than the price of many good new rifles and as much as many high-quality scopes. But if I'd had one of these things 50 years ago (heck, if I'd had one *five* years ago), I would have gotten that money back many times over. If only I'd had a bore-scope kit tucked under my arm every time I walked into a gun show or a gunshop and came home with a used gun that looked just fine with a simple bore light and my naked eye. Got any friends? Go out right this instant and buy a Hawkeye Bore-scope together.

To use a Borescope you simply thread the supplied Mini-Maglite onto the lens housing, turn it on, and look through the eyepiece. Adjust the Mini-Maglite's light beam brightness and intensity as you would normally. (Optional higher-intensity light sources are also available at www.gradientlens.com.) Use the dial on the eyepiece to focus the lighted and highly magnified image you see through the tube. Focus is from 1mm to infinity. The lens tube used alone has a 42-degree field of view. That's fine for close inspection of open surfaces, but you'll need to



The Gradient Lens Hawkeye Borescope's lens tube casts a 42-degree illuminated field of view, and the mirror tube casts that field 90 degrees sideways.

use the included 90-degree mirror tube to look directly at the walls of a bore. The mirror tube slips over the lens tube and can be rotated to view 360 degrees with its knurled base, which has a tactile index notch so you'll always know which way you're viewing. This is very helpful because the mirror tube inverts the image so that right is left and up is down. But you'll get used to that—just like shaving in a mirror.

The 17-inch standard tube is long enough for virtually everything. If your barrel is longer than that (and most rifle barrels are), you can come at it from both ends and still cover every millimeter. And if you happen to have a barrel longer than 34 inches, well, 22-inch Borescope versions are also available; but they're priced considerably higher.

Standard Shooting Edition Borescope Kit tubes will work in .200-caliber bores and larger. If you shoot .17-caliber rifles, you'll need one of the 14-inch or 17-inch Hawkeye Pro SuperSlim Kits, which have a mirror tube outside diameter of 0.15 inch. The drawback here is that the technology necessary to shrink down the diameter is expensive, so the SuperSlim kits cost about twice as much as the standard kits. But if you're serious about .17-caliber shooting, you'll need one to truly monitor your gun. Ultrahigh-velocity .17-caliber centerfires can be hard on bores.

What You Can See

The first thing you'll probably do is check to see just how well you've been maintaining and caring for your most prized personal guns. Be prepared for some surprises. When the Hawkeye Borescope kit arrived for review, I had just "finished" preparing one of my personal favorite Thompson/Center Contender deer-hunting barrels for long-term storage. It's a many-years-old 14-inch 7-30 Waters. (What can I say? I love 7mms, and I'm a sucker for the arcane.) I had given it a thorough brush/solvent/patch treatment, applied copper-fouling removal foam



The mirror tube serves as a tiny lighted "periscope" and slides over the inner lens tube. It can be rotated 360 degrees by a tactile index knob.

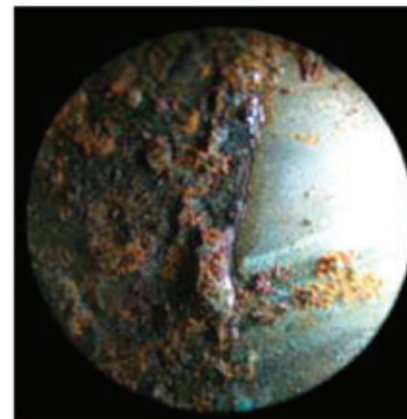


per all instructions, and run a final protection-lube swab down the bore. Clean as a whistle. Looked bright, crisp, and pristine with a light held to its other end. Done, right?

It was still clamped in my bench vise, so I screwed the Borescope together, dialed up the light, and ran the mirror tube in from the chamber end. First thing I discovered was some clear rust pitting about 2 inches in front of the chamber. No way. I would swear that I had always cleaned and oiled that bore after every use. But obviously I hadn't. Or I had not always sufficiently treated the bore to resist rust during the months it spent in storage between hunts over all the years I've had it. Moving on down the bore, about 2 inches back from the muzzle I encountered streaks of copper fouling that had obviously not been completely removed by my just-finished cleaning treatment. Well, I hadn't been as thorough as I'd thought.

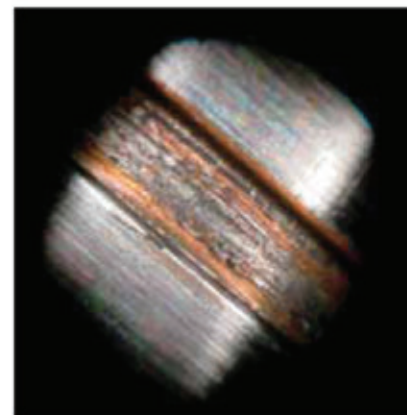
None of this was in any way visible to my naked eye with a bore light. The barrel was still shooting sub-MOA just like it had when it was new, so I hadn't hurt it *too* badly. Yet. But it was highly disconcerting nonetheless. So I treated it again with copper-fouling remover (yep, gone now, the Borescope showed), and before I put it away I made sure that I used enough bore-protection treatment to last for months of storage. And of course you can guess how I spent the next two days—checking all my favorite rifles and hunting handguns to see just how badly I'd screwed them up, too. Don't even ask me what I found.

What can you see through a Borescope? You'll certainly see just how well (or not) you've been treating your guns. You can also locate and identify any bore problems even before they appear to the naked eye or begin to show up in performance. You'll learn a lot about what really affects accuracy and what doesn't, and how barrel wear progresses. If you're thinking about a used gun, or



How much will a nonstainless bore rust in a day if left untended? The Hawkeye Borescope can show you.

a gun show purchase, or acquiring a collectible, you can see what it *really* looks like and how much it's really worth before you put down your money. When comparing different brands of new guns, you can check their bores for differences in bore machining quality between brands. You can also do things like view the inner surfaces of your handloading dies, or find irregularities and

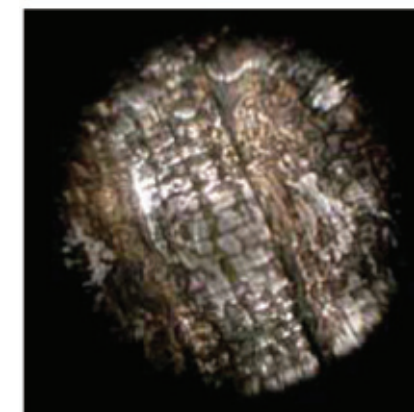


This amount of copper fouling is utterly invisible when using a simple bore light, but it definitely will affect accuracy.

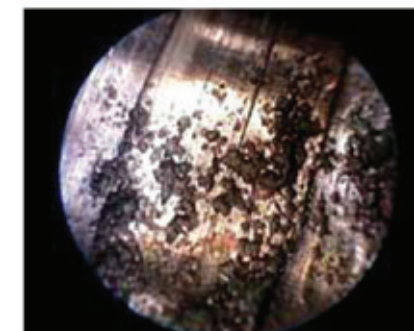
erosion in the forcing cones of your revolvers, or see how well a screw-in shotgun choke actually fits, or examine the locking lug recesses inside an auto pistol slide, or inspect the dimensional consistency of flash holes in fired cartridge cases before handloading them. The list is nearly endless.

The accompanying images provided by Gradient Lens show some of the types of problems you may

encounter. Thankfully, none of my own guns looked quite *that* bad. If you do invest in a Borescope, you might also want a Digital Camera Coupler (MSRP: \$200) for taking images of what you see and keeping a record or, if you're a gunsmith, to show your customer why he *really*



Would you buy this rifle as a collectible at a gun show? Maybe not if you had a Borescope to look at its beautiful "alligator-skin" erosion pattern.



The true depth and severity of rust pits are visible only with the Borescope's ability to look straight down into them.

needs to let you install a new barrel on his old gun (a \$25 coupler/adaptor may be needed for some lens diameters). An Angled Eyepiece (MSRP: \$275) is useful for gun configurations that don't allow you to get your eye directly in line behind the eyepiece. It also has the benefit of re-inverting the reversed-image effect of the mirror tube.

The Gradient Lens Hawkeye Borescope is a serious tool for serious shooters.

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