

**BoreMaster Measuring Device**

Years ago, it came as a shock to me to learn that all shotgun barrels are not created equal. While the nominal diameter of a 12-ga. barrel is .729", many European shotguns have distinctly smaller bores, and many shotguns come from the factory today over-bored to a slightly larger diameter. Also, the standard deviation within the same manufacturer's barrels is pretty wide; it's not uncommon with double-barrel shotguns for each barrel to have a slightly different bore diameter.

The ability to accurately measure a shotgun's bore diameter can be critical in assuring that you make an intelligent choice in buying replacement choke tubes. Additionally, not all choke tubes are created with the same specifications. An improved cylinder is nominally a constriction of .010". If you measure a half-dozen different makers' chokes, you'll likely get numerous readings for the actual constriction.

Being able to accurately measure and read these figures has traditionally required using a bore gauge that looked like a meat thermometer with spring-loaded ball bearings on the bottom of the probe. These devices are usually fairly expensive and generally can accurately measure a maximum of two different shotgun gauges. I had a mechanical engineer once show me how to use one; since I'm not mechanically inclined, resent math, and am intimidated by tools, it took him 45 minutes—and I still had to call him for a refresher the next time I used it.

Enter the BoreMaster from Robert Louis Inc., a digital-readout measuring device that greatly simplifies measuring bore diameter, choke constriction, forcing cone length, and



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barrel-wall thickness. I first saw one at the 2006 SHOT Show and knew immediately that I had to have one. It comes in a well-padded plastic case with an extra battery, calibration ring, and kit to convert the probes for measuring barrel wall thickness. It not only has written instructions but also comes with an instructional video disk for those of us with a low tool aptitude. It looks like a carpenter's square with one leg being a spring-loaded slide rule. How easy is it to use?

To measure bore diameter:

- 1) Push the "on" button.
- 2) Slide the spring-loaded slide forward as far as it will go.
- 3) Push the "zero" button, which resets the digital readout.
- 4) Put the probes into the barrel to the depth you wish to measure.
- 5) Let go of the spring-loaded slide.

Voila, the digital readout gives you the diameter of the bore at the farthest point of the probes. You don't have to add or subtract the numbers from any nominal figure or calibration number; simply read the figure on the digital display.

To measure choke constriction:

- 1) Slide the spring-loaded slide forward as far as it will go.
- 2) Put the ends of the probes inside the choke tube in the end farthest from the muzzle and closest to the chamber.
- 3) Let go of the slide and reset the "zero" button.
- 4) Slide the spring-loaded slide forward to relieve the probe's contact with the inside of the choke tube.
- 5) Put the ends of the probes inside the choke tube in the opposite (muzzle) end of the tube.
- 6) Let go of the slide and read the digital display.

The display shows the difference of the diameter between the two ends of the choke tube, i.e. .010", etc. Since the diameter is measured at the ends of the probes, measurements can be taken of jug chokes, conical choke constrictions, as well as conical-parallel constrictions.

Since the probes are indexed like a ruler, the length of the choke constriction, forcing cone, and chamber can also be measured simply by watching for changes in the digital display as the probes are removed from the bore.

The barrel wall thickness kit includes an elastic "O" ring and a plastic tip that fits on the end of one of the probes. If you've ever considered having a fixed-choke gun retrofitted with screw-in tubes, knowing the barrel wall thickness is vital to ensure that there's enough "meat" at the muzzle to be relieved for the threads and safely compensate for the thickness of the choke tube. The barrel wall thickness feature should also make the BoreMaster popular with "Vintagers" and

shooters with a love of old side-by-sides.

Since the BoreMaster can accurately measure shotguns from .410 to 4 gauge and costs only \$269.95 (800-979-9156; [www.shotguncombogauge.com](http://www.shotguncombogauge.com)), it's an affordable and easy way to add to a shooter's confidence and avoid potential mistakes in purchasing choke tubes.

### Shotgun-Insight Pattern-Measuring Software

Shotgun patterns are like snowflakes; no two are exactly alike—ever. That means that knowing exactly how a gun/choke/cartridge combination will perform is, at best, a guess. We can estimate what the density of a 1<sup>1</sup>/<sub>8</sub>-oz., 12-ga. load of No. 8 shot fired through an improved-cylinder choke will look like, but until you actually shoot the specific combination together numerous times on a patterning board, you don't know for sure what's going to happen downrange.

Traditionally, patterning a shotgun involved shooting a number of cartridges (usually at least five) at individual sheets of paper (usually 48" square, one shot per sheet) at 40 yards, estimating the center of the pattern, drawing somewhere between one and three rings (the largest being 30") around the center, then counting the number of holes in each ring. This is repeated for every variation of choke, gun, and cartridge, so if you want to test three different chokes in one gun with two different cartridges, you'll have to shoot 30 patterns and count about 14,000 holes. That's not most people's idea of a good time.

The study of shotshell ballistics is a non-dynamic, esoteric science that hasn't substantially changed since the development of the plastic wad and shot cup. The means of gathering and collating that data, however, has seen a recent and dramatic advancement.

Dr. A. C. Jones has developed a computer program that can analyze a digital photograph of a shotgun pattern and provide all the information a shooter could possibly want—and more. It will count the number of hits in 10", 20", and 30" circumferences of the point of impact and figure pattern density. It can provide the probability of a hit on both an "edge-on" and a "full-face" target in each of those rings for each individual shot. But more importantly, it can provide an estimate of the average performance for that particular gun/choke/cartridge combination over a series of shots. It can highlight gaps in patterns and even simulate pattern density changes at different distances. The Pattern Optimiser feature can estimate the skill of the shooter, show the effect of altering the spread of the pattern for that particular shooter, and show the effect of point-of-impact errors for that particular choke/cartridge. In short, it's simply amazing.

What you need:

- 1) A digital camera.
- 2) A modern personal computer with an up-to-date version of Windows capable of running Java (the web-based version also runs on a Mac and Unix workstation with Java).
- 3) A patterning board using *plain* paper, *not* preprinted pattern. Jones' website has a link to an art supply company that can provide fairly inexpensive 200-ft. rolls of plain paper. He doesn't recommend using a metal impact target unless it is free from dimples, holes, protrusions or rust scaling; it must have a homogeneous surface that can be painted to contrast with the pellet strikes.

How to use it:

- 1) If using a metallic patterning board, paint it to ensure that the shot pellets will make a contrasting mark that can be distinguished in a digital photograph.
- 2) Shoot the cartridge at a known distance that will be identi-



The digital readout on the BoreMaster gives you the actual diameter. You don't have to add or subtract the numbers from any nominal figure or calibration number; simply read the figure on the digital display.