

FAQ of the Month – How do you measure the accuracy of a rifle?

Although rifles are often referred to as being accurate or inaccurate the proper term for a rifle is precision. Accuracy is a measure of how close the shots are to the intended target and that is really the shooters' responsibility. So how do you measure the precision of a rifle and what are reasonable expectations?

Rifle precision is properly measured by group size at a given distance with shots fired from a steady rest. Best to use an optical sight with the highest magnification available. For example, you can shoot 10 shots at a target 100 yds downrange and have a group size of 4 inches. If you fire more shots the group tends to grow in size up to 20 shots or so. If you shoot less than 10 shots then you might get considerably smaller groups but they are not meaningful. For example, 3 shots in 1 hole doesn't tell you much about the precision of a rifle because the next shot could be 3 inches away.

Continuing with the example above where we have a 4-inch group at 100 yds for 10 shots. What size group can we expect at 200 or 300 yds from this rifle? To answer this question, you have to measure rifle precision in angles not inches. You calculate the size of the group in minutes of angle (moa) where 1-inch at 100 yds is approximately 1 moa. For reference there are 60 minutes in a degree of angle. So, the 4-inch group at 100 yds is 4 moa. We generally assume that the precision of the rifle measured in moa is independent of range, at least out to 400yds. For example, at 200 yds the 4 moa would give an 8-inch group and at 400 yds 4 moa would give a 16-inch group. Beyond 400 yds the consistency of the muzzle velocity has a significant impact on the group size. Shots with muzzle velocity below the average strike lower than those with higher muzzle velocity and the group tends to get taller. At these distances, wind also tends to spread the group out horizontally. Neither of these effects should be blamed on the rifle, however, so it is best to measure rifle precision at short ranges.

What is a reasonable expectation for rifle accuracy? A mass-produced hunting rifle that can shoot a 3 moa group with factory ammunition should be considered good enough for its purpose. Carefully tuning hand loads for that hunting rifle could improve the precision to 1.5 moa. For a competitive target rifle (shot with iron sights and a sling) the precision should be 0.75 moa. For an F-Class target rifle with optical sights, the precision needs to be 0.5 moa. For competitive benchrest shooters the rifle precision needs to be 0.15 moa, most of the time. Remember I am talking about 10 shot groups.

The cost and care required to improve precision increases rapidly as the group sizes get smaller. The hunting rifle could be \$1,000, the target rifle \$3,000, the F-Class rifle \$6,000, and the bench rest rifle could be more. The barrel alone for a competitive F-Class rifle is \$1,000 and you may need to try a few barrels before finding a good one. Precision has its price.

So next time you hear someone talking about a low-cost hunting rifle shooting 100 yds 1/2 inch groups ask how many shots in the group and how many groups they fired before they got a good one.

~ Gord Holloway