HOW WE TESTED

We used two bolt-action rifles for this testing, both pre-'64-style Winchester Model 70s, one manufactured in 1995, the other before 1964. Both performed flawlessly.

Our first test was designed to determine if each bullet would expand under worst-case conditions. An unexpanded bullet seldom produces a quick kill; it usually results in a lingering death and wasted meat. To test expansion, we calculated the 300-yard velocity of each load using the ballistic coefficient and the measured muzzle velocity. We then pulled the bullet and reloaded the round to that velocity using a faster burning powder. A chunk of bacon a half-inch thick with the rind still on was used for the impact medium of this test. It duplicates a between-the-ribs shot on a small deer at 300 yards and is the least likely shot to expand that we could think of. The exiting bullet was caught in our non-distorting bullet trap.

This procedure doesn't exactly duplicate an impact at 300 yards. A bullet loses forward velocity due to air resistance as it flies through the air, but it doesn't lose rotational velocity. It's spinning just about as fast at impact as it was at the muzzle. Since we loaded this round to shoot slower, it's also spinning slower than a normal 300-yard impact. But it makes very little difference; only about one-half of one percent of a bullet's energy is contained in the rotation.

To test this theory, we fired a series of shots from a gun with the rifling reamed out and compared the results to rifle shots at the same velocity. We found no difference in the minimum velocity at which expansion occurred.

Testing Downrange Performance

Our next test was designed to determine if a bullet would cohere on impact. To do this, we fired a load right from the box into a 3-inch cube of fresh beef bone and caught the exiting bullet in our trap. A bullet that survives this test can be expected to penetrate the shoulder bone of a large game animal without fragmenting. A fragmenting bullet that is reduced to a spoonful of shrapnel won't penetrate and probably won't result in a quick kill. Three of the loads we tested didn't survive this test.

Our third test duplicated the soft tissue of a big-game animal. We used a gallon of water contained in a plastic storage bag. It's a more severe test than shooting into a larger quantity of water. In previous tests, we shot most of these same bullets into a 55-gallon drum of water. All mushroomed perfectly and landed intact on the bottom of the drum with little loss of weight. With only a gallon of water, three bullets totally fragmented and two lost more than half their weight. From a practical standpoint, your bullet is more likely to fragment in small game than an elk.

As an extension of our expansion test in water, we measured the penetration in water. After the bullet we were testing expanded in a gallon of water, it traveled another foot and entered our recovery tank through a neoprene diaphragm. By examining the bullet holes in the diaphragm we determined that the bullets had fully expanded in the gallon of water. We measured the distance the bullet penetrated the water column and added 4 inches for the distance through the first gallon of water. This is the penetration distance reported in the summary.

Accuracy Testing

Accuracy was tested by shooting three-shot groups at 200 yards. It's not likely a hunter will get more than three shots at an animal in the field, thus a three-shot group was considered adequate. Our chief tester started the test by shooting a slightly under 2-inch group with his own hand loads in his own rifle, the early Model 70. It was the best group of the test. We continued testing by shooting a three-shot group with each rifle with each of the 14 loads under test. The test results reported in the summary show a group from each rifle with each load. The first group listed was shot with the earlier (older) Model 70 with a 24-inch barrel, the second group was shot with the new Model 70 with a 26-inch barrel. Note that two of the groups shot with the new rifle are quite large, a 9-inch and a 10-inch group. Both were shot a second time with the same or worse results.

We didn't take accuracy into account in our rating of the bullets. With a few exceptions, if one rifle didn't shoot well, the other did. It's quite probable that your rifle will shoot some of this ammunition better than either of our Model 70s. We consider a 4-inch group at 200 yards satisfactory for hunting purposes.

Velocity was measured with an Oehler Model 35 chronograph, actually two chronographs set up to monitor each other. We chronographed the accuracy tests and averaged the three shots fired with the 26-inch barrel. Four of the tested loads achieve the velocity listed on the box, three of them overstated it. But Remington's Safari load (our first choice) understated it by more than 100 feet per second.

We measured the frontal area of the mushroomed bullet and reported the increase in frontal area in the summary. If a mushroomed bullet had twice the area of an unfired bullet, we reported the increase as 100 percent.

The ballistic coefficient of the tested bullets was calculated using the Coxe and Beuglefs formula. It uses the caliber, weight, tip diameter, ogive, length and boat tail. It is correct only for standard atmospheric conditions; no further corrections were done. We calculated the 300-yard velocities using the ballistic coefficient just found and used that velocity to calculate the 300-yard energy. The 300-yard error is the error found when the rifle is sighted in for 200 yards.