

# Close Enough...

## Wayne van Zwoll

**W**HEN YOU WANT someone to build you a sporting rifle you specify all sorts of things. Some of the specifications are important, but most of them aren't. The things that aren't — checkering patterns, swivel studs, floorplate releases, barrel contours — are meant to make the rifle pretty and it would still shoot and function perfectly even if you let someone else select these for you. Embellishments like engraving could be omitted.

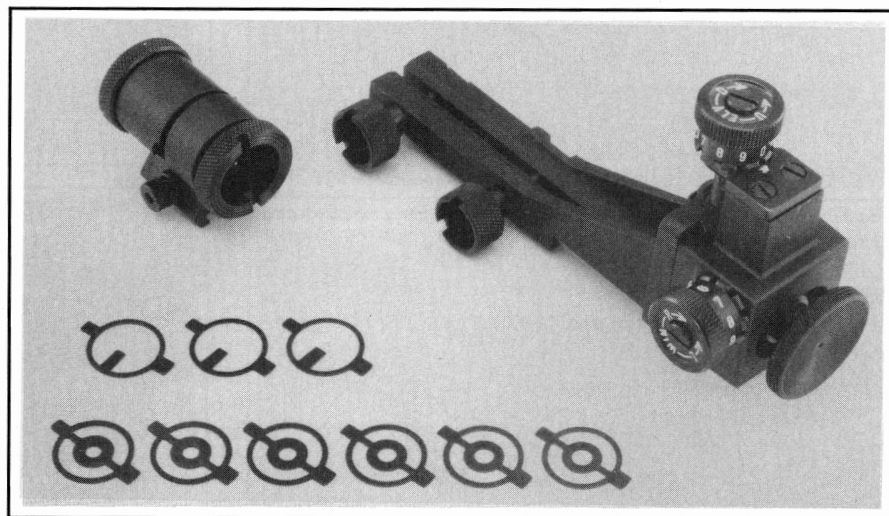
Oddly, few customers are sticklers for accuracy. Some will say they want the rifle to shoot minute of angle, but they don't say with what load or at what range. A minute of angle is a minute of angle at 100 or 1,000 yards, but infinitely harder to shoot at 1,000. If test groups are shot, they're usually clusters of three, sometimes five.

Gunsmiths who build rifles for competitive shooters have a tougher job; each rifle must be competitive. Then too, shooters and ammunition make accurate rifles group poorly, and even the rifle, lapped, miked, air-gaged and glassed to watchworks tolerances, might not shoot well. There is method and science to building accurate rifles, but to date not all things are understood.

The hardest job of all, then, is building accurate rifles in volume. There's no time to tune and handwork must be kept within reason so price can be, too. Surely you've noticed how few production-line rifles must shoot well — and how costly guaranteed competitive accuracy can be.

Kimber's Model 82 Government rimfire is among the few truly accurate rimfire rifles in the world, and of those, one of the least expensive. But that's just the end of the story.

In November 1986, the U.S. Army notified Greg Warne, then president of Kimber, of a contract opportunity. The Army and Marine Corps were looking for a new rimfire rifle to be used in three-position indoor matches and to



The Model 82 Kimber Government rifle is issued with a Diana front sight and seven aperture inserts and three posts. The rear sight is manufactured by Kimber and is threaded to interchange with Anschütz discs; an adapter is provided to accommodate others.

train military marksmen. The contract would be for 10,000 rifles.

By February 1987 Greg had determined that the Kimber 82 action would work in such a rifle, and in March he started building a prototype. In June Kimber submitted a bid.

The Oregon company underbid six other firms: Anschütz, Walther, Remington, Ruger, U.S. Repeating Arms, and Harrington and Richardson. Bids were close. The two lowest differed by 3.6 percent, and the difference between Kimber's bid and the nominal bid was only 7 percent. In June Kimber was formally notified that it had won the contract. Work on the new rifle began immediately.

"Close enough for government work" means not very close — most of the time and it certainly doesn't apply to target rifles! Specifications are stringent and tests are demanding — performed on rifles chosen at random throughout the production run. And then there is Federal Acquisition Regulation paragraph 52.249-8: "... the contractor will be liable to the U.S. Government for any excess costs for those supplies or services." What that means is if the rifle doesn't shoot, the contract will be given to the next bidder and you pay the difference in bids!

Kimber submitted six stock designs; the Army selected one. The proven 82 action, in single-shot form, was given a more sophisticated trigger. At first, meeting accuracy standards seemed simply a matter of finding and contracting good barrel blanks. Then tests would show the best chamber dimensions to use. The only requisites for tests were a firing tunnel, superior scope, good marksmen and consistent ammunition.

The tunnel was graciously provided by Leupold & Stevens in nearby Beaverton. Leupold also supplied a 36x target scope for testing. A few shooters who could cut bullet holes at 50 yards surfaced. Ammunition was but a second thought; all it needed was Army approval as stated in paragraph 3.3.5.1 of specifications: "Ammunition. The rifle shall meet the following targeting and accuracy requirements using selected lots of match grade ammunition conforming to SAAMI standards having an average extreme spread of all targets at 100 yards of 1.25 inch or less."

A minute and a quarter — surely a reasonable demand of target rifles with target ammunition. Oddly enough, although SAAMI match standards call for groups that size, no domestic manufacturer will guarantee its am-

munition to shoot them! In fact, CCI was the only one willing to provide any certificate of performance with its product!

Sobering, this lack of manufacturers' guarantees. Not only did it stymie the search for test ammunition, it jeopardized the proofing of completed rifles. How could rifles be certified accurate without accurate ammunition? Was it that hard for rimfire bullets to stay in an inch and a quarter? If so, what about the accuracy standards for contracted rifles?

Kimber contacted the Army regarding this problem and the SAAMI standards for ammunition were waived — but retained for the rifle tests paragraph 3.3.5.3: "Accuracy. The average extreme spread, measured from center to center of shot holes, of three consecutive 10-shot groups fired at a range of 100 yards shall not exceed 1.50 inches and no individual group shall exceed 1.75 inches or 3 consecutive 10-shot groups fired at a range of 50 yards shall not exceed 0.70 inch average extreme spread and no individual group of the series shall exceed 0.80 inch."

This meant Kimber would have to produce rifles meeting original accuracy standards but was not constrained to use ammunition described in 3.3.5.1 — ammunition that did not exist anyway!

Kimber then launched a most ambitious ammo-testing program. Three rifles — an Anschutz 54, a Winchester 52 and a Kimber 82 prototype comprised the test battery. Each was a proven performer with selected am-

munition. Over the next few months Kimber shooters fired over 65,000 rounds, testing 19 lots of eight brands of ammunition. By December 1987, company computers had on file over 1,200 10-shot groups.

These tests showed match ammunition to vary a great deal in accuracy — certainly between makers, but also within brand and type, and too often between lots. Kimber needed ammunition that would *always* shoot under .700 inch at 50 yards, from any rifle an inspector might choose. Of particular concern were the "First Article" tests to begin shortly. From 10 production rifles, three would be chosen for nit-picking examination of fit, form and function. Three 10-shot groups from each of the rifles had to average .700 inch or less — no alibis or refrings.

That was but the beginning. An endurance test followed, as per paragraph 3.3.6. "The rifle shall be capable of withstanding the firing of 5,000 rounds and 500 snaps on an empty chamber .... Cleaning and lubrication are allowed after each 500 rounds and at the end of each day's firing. Live firing and dry firing shall be alternated in cycles of 1,000 rounds and then 100 snaps. After the 5,000 rounds and 500 snaps, the rifles shall meet the trigger pull and targeting and accuracy requirements of this specification."

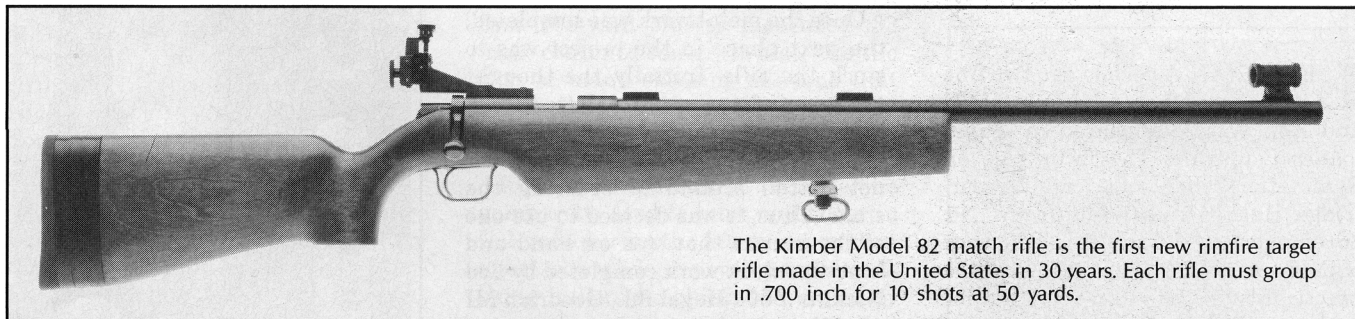
After 1,188 test groups, the best match ammunition from Eley, Winchester, Fiocchi, Lapua, RWS, Federal and CCI collectively averaged .760 in the test rifles. Only 49.3 percent of the groups were under .700, 64.75 percent under .800. The encouraging thing was, some lots of Eley did much better.

Of 143 10-shot groups of Tenex fired from the Kimber, 94.4 percent clustered under .700 and 97.9 percent under .800! The smallest group miked a mere .230! Although the largest, at 1.270, was clearly unacceptable, it was just as clearly a fluke.

Each of the three test rifles shot well. If results weren't the same, they were comparable. The number of groups for each type of ammunition differed between rifles, as did the average group size for each rifle. The smallest groups of CCI Green Tag, Western Mark III, Eley Tenex, Winchester Super Match and Fiocchi Gold were all well under .700, regardless of the rifle used. As more shots were fired, average group size climbed. For example, CCI Green Tag averaged .618 and .455-inch for four groups each from the Anschutz and Winchester rifles, but .913 inch from the Kimber after 45 groups, the same rifle that nipped out an incredible .491 average during its 143-group marathon with Eley.

Although group sizes varied markedly, percentage differences perhaps overstate what really happened in the tests — particularly in regard to the best ammunition. Human error figured, surely. Can you hold to the third decimal place? I can't! I fired one of the new Kimbers in a test tunnel, with Eley Tenex and a 36x Leupold. My 10-shot group measured .658, hardly as tight as the rifle or ammunition could shoot, or as tight as I've often shot outdoors, prone, in competition. What makes averages so hard to shrink here is that every shot counts and you shoot a lot of shots. One bullet hole that is

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The Kimber Model 82 match rifle is the first new rimfire target rifle made in the United States in 30 years. Each rifle must group in .700 inch for 10 shots at 50 yards.

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half an inch from a nine-shot .250-inch cluster makes for a mediocre .500 at best. That group averages with others equally susceptible to fliers. None are thrown out.

Kimber's first article test came in December 1987. There had barely been enough time to confirm, with the superior Tenex, bore and chamber dimensions for the new rifle. Wilson six-groove barrels with .2183-inch bores, rifled with a one-in-16-inch twist and a groove diameter of .2212 inch, were chambered with special reamers.

Each of the three selected rifles shot under the .700-inch limit. After endurance firing groups were even tighter. Fit, form and function surpassed Army standards.

A subsequent letter from Kimber to George Wilson of Wilson Arms noted that "... in every instance your standard groove diameter barrels were superior in accuracy with all ammunition tested. ... Our current production rifles utilizing your barrels are all surpassing Mil. Spec. MIL-R-1296 [and] on December 18th the Army ordered an additional 5,000 rifles, making the total currently on order 15,000 match rifles."

The Model 82 Government Rifle is meant to be used with iron sights and when Kimber bid the contract sights were part of the bargain. Choosing to use front sights already made by Diana, Kimber designed its own rear sight. Again the Army had standards. The sight was allowed no more than .001 inch backlash after 20 of its 1/4-minute clicks. The average movement per click could vary only to 15 percent from the nominal movement. On the rifle and set at zero, the sight had to be aligned closely enough that "each of a series of 10 shots fired at 50 yards shall be within or cut the edge of the 2-inch bullseye."

This sight performed well. Backlash during the tests stayed within half the permitted movement. Differences between average and nominal movement during adjustment were under 2 percent — far below the 15 percent allowed. Groups fired for zero centered the bullseyes. This is certainly one of the most precise target sights ever made.

The Diana front sight comes with seven aperture inserts and three posts. The rear sight disc is threaded to interchange with Anschütz discs, but an

adapter is provided to accommodate others.

Kimber's new rifle passed lots of tests — odd ones like chemical immersion of its butt spacers, as well as the tests you might expect of a target rifle. Headspace, sight clearance, bolt function, stock dimensions and rifle weight all checked out. The trigger, adjustable for sear engagement, weight of pull and overtravel, easily met standards for a consistent two-pound pull. Pressure proofing to between 310 and 330 copper units produced "no evidence of cracks, seams, bulges, splits, rings or other defects." Headspace remained in the acceptable range: .042 to .046 inch.

After first article proofing, Kimber accelerated production of the Government Rifle at its Colton plant. This 11-acre site is wooded, rural and a 30-minute drive from the Clackamas headquarters. Zoning problems had closed the plant before; Kimber solved them and bought the 16,000-square-foot plant in the summer of 1987. By autumn the plant was in use. Early in 1988 a 50-yard shooting tunnel had been installed. Now two shifts of shooters test-fire 40 rifles a day there — over 50,000 rounds a month! Kimber Government rifles are assembled at Colton, where the stocks are also shaped and inletted. Metal machining is done at Clackamas. The Colton plant now has shipping facilities.

Nearly half the man-hours at Kimber are now spent with the Government rifle. Standards are never relaxed. Each rifle must shoot into .700 inch. The videotape recording test groups by rifle serial number is available for inspection at any time. Of the 150 rifles in each lot, 13 are chosen at random to check weight, headspace, trigger pull. Still another 10-shot group is fired from each of these rifles — as if to tempt bullets out of their .700-inch corral.

The Kimber Model 82 Government rifle is the first new rimfire target rifle made in the U.S. in 30 years. It weighs just over 10 pounds and is 43 inches long with its 25-inch barrel. A movable handstop and three butt spacers make the stock somewhat adjustable. The rifle feels good. It shoots better than you or I can shoot. Maybe that's all you need to know.

The Army, however, was more demanding. In meeting its demands Kimber discovered some surprising things about rimfire ammunition, barrels, chambers — and what "close enough for government work" really means! The result: a superior rifle. ●

Rifle 130