



Shooting And Loading The Hornady 6.5 Creedmoor



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While new ammunition offerings for hunting come out just about every year, the debut of a new target cartridge is a rare event. Only a handful of factory competition rounds—such as the 6 mm PPC, 6.5x47 mm Norma, DTAC 6XC and 6.5-284 Win.—have been introduced in the past couple of decades. In 2008, Hornady Mfg. Co. added a new cartridge, the 6.5 Creedmoor, to that select group.

The 6.5 Creedmoor resulted from a conversation in 2007 at Camp Perry between Hornady Senior Ballistician Dave Emary and Dennis DeMille, general manager of Creedmoor Sports and 2005 NRA National High Power Champion, about the ideal match cartridge. DeMille suggested a list of characteristics, including match-grade accuracy, a high-ballistic coefficient (BC) bullet, low recoil, good barrel and brass life, moderate chamber pressure, wide availability, economy and a 2.800" overall length for feeding from short-action magazines.

Emary took DeMille's list back to Hornady and used it to begin development of a new cartridge.

Emary selected 6.5 mm for the new round because of the available selection of 0.264"-diameter match projectiles, all of which offer high ballistic coefficients and excellent accuracy. It also didn't hurt that one of the very best of those projectiles—the 140-gr. A-MAX (0.550 BC)—was already made by Hornady.

The new cartridge, named 6.5 Creedmoor in recognition of DeMille's contribution, commenced production in June 2008 with Hornady's new 120-gr. A-MAX bullet (0.465 BC). The 140-gr. A-MAX load was released in volume about a month later.

The 6.5 Creedmoor could be described as a .260 Rem. modified with a 0.11" shorter case, a sharper 30-degree shoulder, and less body taper. Full case capacity of the Creedmoor is 52.1 grs. of water, compared to 54.4 grs. for the .260 Rem. (both measurements taken using new, unfired cases). When

match bullets are seated to 2.800" overall length (OAL) in both cartridges, however, the deeper bullet intrusion into the Remington case reduces the difference in effective capacity to only about 0.7 gr.

Current specifications for the 120-gr. A-MAX load are 44.5 grs. of H4350 powder, a Fed. 210M primer and 2.720" OAL for 3020 f.p.s. muzzle velocity. For the 140-gr. A-MAX, they are 41.9 grs. of H4350, a Fed. 210M primer and 2.800" OAL for a muzzle velocity of 2820 f.p.s. Velocities were measured in 28" barrels. The OAL of the 120-gr. load is shorter than that of its 140-gr. sibling to accommodate the lighter bullet's fatter ogive, which requires deeper seating in the case to prevent contact with the rifling.

Reamers for the cartridge are made for Hornady by Pacific Tool & Gauge. By standardizing chamber and throat dimensions, Hornady can produce factory 6.5 Creedmoor ammunition capable of consistent performance in any rifle chambered for it.

Factory Ammunition Test-Fire Results

Both 6.5 Creedmoor loads were tested in the two factory guns currently chambered for the cartridge: the Tubb 2000 match rifle (designed by 11-time NRA National High Power Champion G. David Tubb) with a 28" medium-heavy Schneider barrel having a 1:8" twist, and the DPMS LR-6.5, with a 24", 1:7.5"-twist heavy barrel. Optics for the Tubb and DPMS guns were from Leupold and U.S. Optics, respectively. Also included in testing was a custom bolt-action tactical rifle by GA Precision, supplied by former USMC sniper Tony Gimmellie, who is one of the best tactical rifle competitors in the country. Gimmellie's GAP rifle had a 26½" Krieger barrel in a 1:8" twist and a U.S. Optics scope.

Both loads were chronographed with a Kurzzeit PVM-21 chronograph from NECO [(800) 451-3550, www.neconos.com]. Measured velocities in the three rifles corresponded fairly well with nominal factory figures, given the normal variations in bore and rifling dimensions. It is also worth noting that the DPMS and GAP rifles sported barrels shorter than the 28" tube used to generate the Hornady data.

Five-shot groups with factory 140-gr. loads averaged 0.57" in the GAP rifle, 0.61" in the Tubb 2000, and 0.72" in the DPMS, corresponding well with the 0.5- to 0.75-m.o.a. groups obtained in Hornady's testing. The performance of the DPMS rifle was particularly impressive, as the gun was shot off a bipod, with all rounds fed from the magazine. In general, the 120-gr. load was less accurate than the 140-gr. load (see accompanying table). Recoil in all three guns, with both loads, was light.

Twenty rounds of each factory load were individually gauged for consistent base-to-ogive length using a Davidson Seating Depth tool from Sinclair Int'l [(800) 717-8211,

www.sinclairintl.com], and seated bullet straightness/concentricity with a Concentricity Gauge from NECO. Base-to-ogive length, a dimension that reflects bullet jump to the rifling, varied about 0.005" among the 20 samples of each load, with more than half showing only 0.001" variation. Although 0.005" is not much, in some guns, long-range grouping might be improved by sorting factory rounds for consistency in this measurement. Seated bullet straightness (measured about halfway down the ogive) ran from 0.001" to 0.006", with about half having 0.0025" runout or less. This compares well with the best factory match ammunition I have tested.

Reloading The 6.5 Creedmoor

Though Hornady's main focus is on its loaded 6.5 Creedmoor ammunition, the company offers brass, 120- and 140-gr. A-MAX bullets and standard- and match-grade die sets. Match die sets feature interchangeable neck-sizing bushings and a floating-chamber bullet seater that promotes maximum bullet straightness in the neck.

Reloading the 6.5 Creedmoor is straightforward, and can be made as simple—or complex—as the shooter wishes, depending upon the level of case preparation desired. To ascertain case uniformity, I took 50 new cases and first weighed them on a Hornady GS-1000 digital scale. Mean case weight was 148.1 grs., with 74 percent being no more than 0.5 gr. lighter or heavier than that weight, and 82 percent varying +/- 0.7 gr. (+/- 1/2%). Case weight is significant in that variations in

Hornady loads its 6.5 Creedmoor ammunition with its high-BC 120- (l.) and 140-gr. A-Max bullets.



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weight translate into variations in volume.

A Sinclair Case Neck Gage was used to sort cases by neck wall uniformity. Excessive case neck runout reflects variance in case body wall thickness, which can cause the bullet to enter the rifling at an angle. Both conditions decrease accuracy. Neck wall thickness was 0.014" to 0.015", with 66 percent of the cases showing 0.001" or less total runout, and 80 percent having no more than 0.0015" runout. This is truly excellent consistency for factory match-grade brass, and largely obviates the need for neck turning. Perhaps the biggest problem in reloading the 6.5 Creedmoor at this time is the lack of pressure-tested data, other than the loads listed on the cartridge boxes. For reloaders who can't wait for the release of new data, Hornady offers some cautious advice.

The Creedmoor seems to give the best pressure/velocity relationships with medium-slow powders such as Accurate 4350, Alliant Reloder 19, Hodgdon H4350, IMR 4350, VihtaVuori N160 and N550 and Winchester 760. Hornady suggests that powders as quick-burning as Alliant Reloder 15, Hodgdon Varget and Winchester 748 may be suitable with 120-gr. A-MAX projectiles, especially in semi-automatic rifles.

Hornady's published factory loads for its A-MAX bullets are not necessarily safe with other bullets of similar weight. Hornady recommends that shooters wishing to try

6.5 CREEDMOOR NOMINAL SPECIFICATIONS

CASE LENGTH	1.92"
CASE HEAD DIAMETER	0.473"
CASE SHOULDER DIAMETER	0.462"
CASE SHOULDER ANGLE	30°
CASE CAPACITY	52.1 GRS. WATER (MEASURED, NEW UNFIRED CASES)
FACTORY CTG. AVG. PRESSURE	58,000-59,000 P.S.I.
CARTRIDGE MAX. PRESSURE	62,000 P.S.I.
PRIMER SIZE	LARGE RIFLE
MEASURED CTG. MAX. OAL	2.815" (140-GR. A-MAX)
BALLISTICS	—120-GR. A-MAX: 3020 F.P.S. (28" BBL.) —140-GR. A-MAX: 2820 F.P.S. (28" BBL.)
SUGGESTED RETAIL PRICE/BOX	\$32.70 (120-GR. A-MAX), \$33.03 (140-GR. A-MAX)

HORNADY 6.5 CREEDMOOR SHOOTING RESULTS

6.5 CREEDMOOR	120-GR. A-MAX Lot No. 3080585	140-GR. A-MAX Lot No. 3080532
DPMS LR-6.5		
MUZZLE VELOCITY	2974 F.P.S.	2703 F.P.S.
STANDARD DEVIATION	9 F.P.S.	10 F.P.S.
ACCURACY @ 100 Yds	0.83"	0.72"
GA PRECISION		
MUZZLE VELOCITY	*	2766 F.P.S.
STANDARD DEVIATION	*	13 F.P.S.
ACCURACY @ 100 Yds.	*	0.57"
TUBB 2000		
MUZZLE VELOCITY	3079 F.P.S.	2853 F.P.S.
STANDARD DEVIATION	9 F.P.S.	11 F.P.S.
ACCURACY @ 100 Yds.	0.69"	0.61"
AVERAGE VELOCITY FOR 10 ROUNDS FROM 24" (DPMS), 26½" (GA PRECISION) AND 28" (TUBB 2000) BARRELS, MEASURED USING KURZZEIT CHRONOGRAPH. RANGE TEMPERATURE: 88° F. ACCURACY FOR FIVE CONSECUTIVE, FIVE-SHOT GROUPS AT 100 YDS. SHOT FROM SANDBAGS (TUBB 2000) OR BIPOD (DPMS AND GA PRECISION). *NOT TESTED IN THIS RIFLE.		

bullets such as the 139-gr. Lapua Scenar or 142-gr. Sierra MatchKing start with charge weights of H4350 about 2 to 3 grs. lower than the factory load for the 140-gr. A-MAX. With any bullet, seating depth must be controlled to prevent the bullet from contacting the rifling.

Also, although there is roughly 3,000 to 4,000 p.s.i. difference between the average pressure of 6.5 Creedmoor factory loads (58,000 to 59,000 p.s.i.) and the maximum cartridge pressure (62,000 p.s.i.), one should not try to "hotrod" the cartridge. The QuickLOAD internal ballistics program from NECO shows that this pressure difference produces only about a 35 to 50 f.p.s. increase

in bullet velocity. Basically, there is only so much that can be obtained from a cartridge case of a given size, at a given pressure level. In the 6.5 Creedmoor, any velocity above about 3050 to 3060 f.p.s. with 120-gr. bullets, or about 2850 to 2860 f.p.s. with 139 to 142-gr. bullets (both in 28" barrels), will likely be obtained only through excessive pressure.

While we're talking about pressure, it's also important to keep in mind the importance of proper bore and chamber dimensions. Hornady has received a few reports of apparent signs of high pressure—mostly loose primer pockets—with the factory 120-gr. load, and after investigation, was

Using a NECO Concentricity Gauge to measure the straightness of the seated bullets in relation to the axis of the cartridge, the author found Hornady's 6.5 Creedmoor loads compared well with the best factory match ammunition.



able to attribute these instances to barrels with either short throats or tighter-than-normal bores. In some cases, the barrels had bores as much as 0.002" tighter than the nominal groove specification of 0.264". According to Dave Emary, 6.5 Creedmoor barrels should measure 0.257" and 0.264" for the land and groove diameters, respectively.

As with any cartridge, maximum loads should be approached with care. While Hodgdon Extreme powders such as H4350 are designed to be temperature-insensitive, some other propellants may show significant pressure variations with changes in ambient air temperature. The reloader must be vigilant for signs of pressure, such as sticky or hard bolt lift; loose, pierced or excessively flattened primers; soot around the primer pocket; and breechface imprinting on the case head. Hornady brass tends to be slightly soft, and may show some of these signs at somewhat lower pressures. According to Hornady, this softness may actually allow more loadings before the brass work-hardens to the point of being unusable.

Measurements of case head expansion with a precision micrometer can also be used to gauge relative pressure levels. First, the head diameters of a number of new factory rounds are measured both before and after firing, giving an average figure for the expansion produced by chamber pressure. Similar before-and-after measurements of handloaded rounds (made with new factory brass) will give a rough indication of their level of pressure relative to factory ammunition. As a general rule, reloads that produce more case head expansion than factory rounds should be avoided.

Both the standard and match-grade dies resize the case sufficiently for proper functioning in semi-automatic rifles, so small-base dies are not required. For bolt-gun ammunition, neck-sizing bushings of 0.289" to 0.290" are

best. Smaller 0.286" to 0.287" bushings should be employed with semi-auto rifles, however, for greater neck tension to prevent bullets from being pushed back into the case during feeding.

Hornady states that case life may be extended to 10 to 15 loadings with moderate charges. With this many loadings, cases must be trimmed regularly, and the reloader must watch for the formation of the "dreaded doughnut," a thickened ring inside the case neck at the neck-shoulder junction. This can increase pressure and decrease accuracy when the seated bullet shank extends beyond that point, as it does in the Creedmoor, so neck reaming may be required periodically. Note also that the greater degree of neck sizing needed with semi-automatic rifles can prematurely work-harden the neck, shortening case life.

The 6.5 Creedmoor is a notable new development—not revolutionary, perhaps, but a rational evolution in following proven cartridge design principles and in maximizing the balance between velocity, accuracy, recoil, barrel life, reloadability and economy. When the load is tailored to the rifle, the 6.5 Creedmoor is capable of accuracy on a par with any other cartridge used for high-power, F-Class or tactical competition.

Even in its infancy, the 6.5 Creedmoor has won acceptance by the competitive shooting community. At the summer Sniper Match at Reade Range, Pa., on August 2-3, it was used by Rob



Competition cartridges introduced in the past couple decades include, (from l.) DTAC 6XC, 6.5 Creedmoor, .260 Rem. and 6.5 mm-284.



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Ormond and Tony Gimmellie to place first and third, respectively. Unfortunately, the 6.5 Creedmoor was too new for many shooters to compete with it at the 2008 National Championships at Camp Perry. Nonetheless, it was used by Dennis DeMille to help Team Creedmoor—DeMille, Norm Houle, Ron Zerr and Joe Hendricks—win the Rochester National Defense Contingent (RNDC) Trophy, which is awarded each year to the highest-scoring team in the NRA High Power Rifle Championships.

As part of Hornady's ongoing product-enhancement effort, testing is currently underway on a new, lower-recoil 120-gr. load, which some high power shooters have requested for use in the 200- and 300-yd. rapid-fire stages of across-the-course competition. Any such new load might be available as soon as 2009, provided, of course, that it meets Hornady's standards for accuracy, ballistic consistency and safety.

Hornady's new 6.5 Creedmoor clearly achieves its intended goals—precision shooting from magazine-fed bolt-action and semi-automatic rifles—and affords accurate and reasonably priced factory ammunition for shooters who don't reload, or who compete in events requiring the use of commercially loaded cartridges. ■

For more information, contact Hornady Mfg. Co. (Dept. AR), P.O. Box 1848, Grand Island, NE 68802-1848, (800) 338-3220, www.hornady.com, or Creedmoor Sports, Inc. (Dept. AR), 1405 S. Coast Highway, Oceanside, CA 92054; (800) 273-3366; www.creedmoorsports.com.