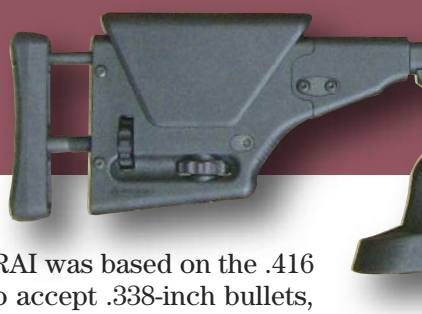
.338 Lapua Magnum

Tips and High-Performance Handloads

The .338 Lapua Magnum shares the same .338-inch bullets as the .338 Winchester Magnum but has notably greater powder capacity and is designed for long-range work.



Brian Pearce

The .338 Lapua Magnum (LM) was initially developed in 1983 by U.S.-based Research Armament Industries (RAI). After further development, it was adopted as a military sniper and long-range cartridge to fill the void between the 7.62x51mm NATO (.308 Winchester) and .50 BMG. As is often the case with government-adopted cartridges, it is now enjoying considerable popularity among civilians, where it is being used for hunting and target competitions. Every major U.S. ammunition company is now producing loads, and a variety of rifles are appearing on dealer shelves.

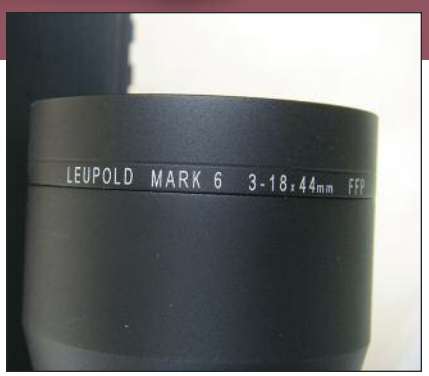
Original development by RAI was based on the .416 Rigby case necked down to accept .338-inch bullets, with the case shortened and the shoulder angle changed. Initially it was loaded to push a 250-grain bullet around 3,000 fps. The Rigby case, however, was not really ideal for the notably greater pressures generated by the .338/416, and there were reported failures just forward of the head. As a result, RAI contracted with Brass Extrusion Labs Limited (BELL) to make an improved or strengthened case, but those, too, were unsatisfactory. In 1984 RAI began working with Lapua of Finland to make cases, but due to financial difficulties, RAI was unable to continue development and discontinued pursuing military adoption.

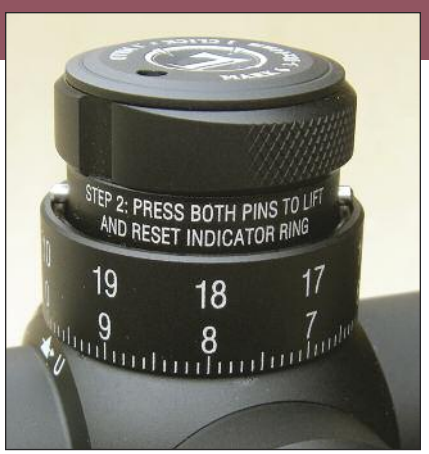
Beginning in 1985, Lapua went back to work on the cartridge, putting it into production in 1987, but it had been further redesigning from the original .338/416 RAI version, with special attention to increase the strength of the web and sidewalls just forward of the head. Cases were also designed with an increase in zinc content, which was intended to make the brass stronger to better withstand pressures. This metallurgy combination, however, has caused cases to delaminate (or split) without even being fired, which resulted in additional changes in the brass formula,

and they were annealed at the case mouth and shoulder to enhance accuracy, etc. Ultimately the cartridge was given a 20-degree shoulder (rather than the 45-degree shoulder of the .416 Rigby) and a case length of 2.724 inches. Maximum overall cartridge length was 3.681 inches, making it even slightly longer than the .375 H&H Magnum.

Most of the world's major military forces have officially adopted the .338 LM, and it has seen considerable use in conflicts, including the Iraq and Afghanistan wars, where it has flexed its long-range muscles with confirmed kills at over 2,700 yards – more than 1.5 miles.

Above, a Savage Model 110 BA was used to develop handload data. Right and far right, a Leupold Mark 6 3-18x 44mm scope was matched with the rifle and has many tactical features.





In sporting applications, it has proven accurate in long-range match competition and offers enough muscle for larger species of thin-skinned game such as elk, moose, the great bears of the North and African plains game.

Early .338 LM rifles were offered by Sako, but today several U.S. rifle manufacturers are offering firearms so chambered. A Savage Model 110 BA was obtained, which is primarily designed for law enforcement and long-range target work, but it would also serve as an excellent test vehicle for developing load data. It features the Savage all-aluminum AccuStock with Magpul buttstock, a 26-inch barrel with muzzle brake and detachable, five-round magazine. Also standard is the Savage AccuTrigger, which is factory set with a crisp let-off of just 12 ounces.

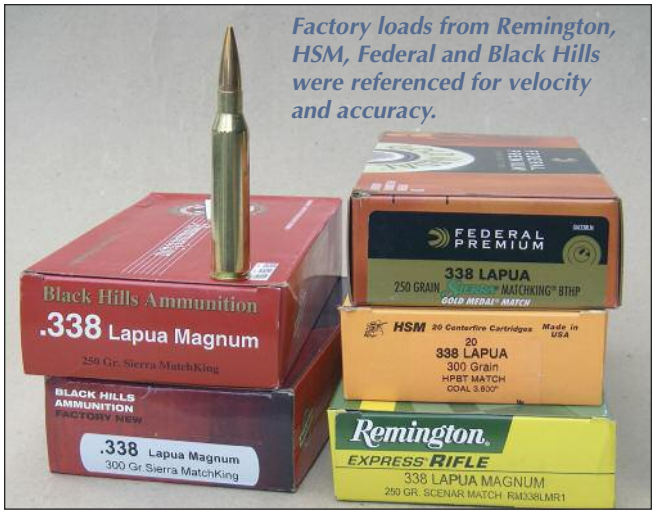
The most common twist rate for the .338 LM is one turn in 10 inches (with Sako being 12 inches); however, the Savage rifle features a 9-inch twist. The 10-inch twist is suitable with all 250-grain bullets and will stabilize even longer bullets, such as the Barnes 265-grain TAC-TX BT and 280-grain LRX BT, the Hornady 285-grain BTHP, Sierra 300-grain HPBT MatchKing and Berger 300-grain Hybrid. At extreme ranges, however, the 9-inch twist offers greater bullet stability with the above heavyweight bullets. On the other hand, this faster twist will produce slightly greater chamber pressures (with some available published data giving excess pressure in this rifle).

A couple of years back, Leupold introduced its new Mark 6 riflescopes that offer state-of-art design, quality and precision. For review purposes, on the Savage Model 110 BA, the 3-18x 44mm model was selected, which has a 34mm tube (installed in Leupold Mark 4 34mm rings). One of its many significant features is its first focal plane that magnifies the reticle along with the image and allows hunters and target shooters accurate referencing (or range estimation) at all ranges and at any power setting. The lens system is what Leupold refers to as the Xtended Twilight that optimizes low-light wavelengths and light transmission and is finished with DiamondCoat 2 for durability and protection from the elements. At just 11.9 inches in length and 23.6 ounces, it is around 20 percent shorter and lighter than the competition.

There are no SAAMI standard pressure guidelines for the .338 LM, but there are CIP standards. Regardless, it has been loaded to different pressures levels, with most production ammunition (both U.S and foreign) currently being held to around 61,000 psi maximum.

A variety of factory loads were checked for velocity and accuracy (Table I). From a sandbag rest, the Model 110 BA managed to place four shots from every factory load under one inch at 100 yards, with select loads staying under .5 inch or less. At 200 yards, some of the better loads would stay under .75 inch.

All bullets used in factory loads are available as components, and with the many excellent magnum rifle powders available, it was easy to assemble handloads that dupli-



Factory loads from Remington, HSM, Federal and Black Hills were referenced for velocity and accuracy.

Table I

.338 Lapua Magnum Factory Load Performance

load (*grains*)	advertised velocity (*fps*)	actual velocity (*fps*)	best group (*inches*)
250 Black Hills Sierra Match	2,950	2,937	.70
250 Federal Sierra Match BTHP	2,950	2,934	.85
250 Hornady BTHP	2,900	2,914	.65
250 Remington Scenar Match	2,960	2,861	.45
285 Hornady BTHP	2,745	2,766	.50
300 Black Hills Sierra MatchKing	2,800	2,671	.90
300 Federal Sierra Match BTHP	2,580	2,561	.65
300 HSM HPBT Match	2,735	2,701	.50

Notes: A 26-inch barreled Savage Model 110 BA was used to test-fire the above loads at 100 yards.

Be Alert – Publisher cannot accept responsibility for errors in published load data.

cated all factory loads, and in some instances exceeded them.

In preparing for this handloading article, I began purchasing new Lapua .338 LM cases more than two years ago. The components shortage is nationwide and I (probably like you) have struggled in obtaining the items necessary to keep shooting and developing data for *Handloader* magazine and Load Data.com. Cases were never available in large quantities and were purchased in various lot numbers and from different sources. Also obtained were cases from HSM, NoslerCustom, BHA (which are manufactured by various sources) and Hornady, which manufactures its own.

Many varieties of bullets for various applications are available for the .338 Lapua Magnum.

The Lapua cases were prepared by sizing, trimming, chamfering case mouths inside and out, uniforming flash holes, etc., but the lot numbers were kept separated. In weighing these cases, there were three distinct weights (without primer) at around 325, 328 and 333 grains. When load development began, it quickly became apparent that these lot numbers each behaved differently. One batch offered sticky case extraction prematurely, while the identical load in cases from a different lot number handled the load without issue. Regardless of how the case behaved with a given load, velocities of each were very similar. Research indicated this is primarily the result of metallurgy changes that Lapua has made to the case.

I was especially pleased with the precision associated with NoslerCustom cases, which came from the factory fully sized, trimmed, chamfered and the primer flash holes uniformed. The work has been done, and they are ready for a pet load. They also handled maximum pressure loads with ease, as did HSM cases.

Table II .338 Lapua Magnum Handloading Data

bullet (*grains*)	powder	charge (*grains*)	case	overall loaded length (*inches*)	velocity (*fps*)	comments
200 Hornady SP-RP	H-4350	80.0	Lapua	3.565	2,985	
		82.0			3,033	
		84.0			3,095	
		86.0			3,159	
		88.0			3,190	
		90.0			3,256	
		91.5			3,301	
200 Hornady SST	VV-N160	80.0	Lapua	3.565	2,976	
		82.0			3,020	
		84.0			3,088	
		86.0			3,139	
		88.0			3,195	
		90.0			3,249	
		92.0			3,295	
200 Nosler AccuBond	RL-19	86.0	Lapua	3.580	3,074	
		88.0			3,133	
		90.0			3,200	
		92.0			3,261	
		94.0			3,324	
		96.0			3,378	
215 Sierra SBT	RL-19	85.0	Lapua	3.575	2,982	
		87.0			3,040	
		89.0			3,118	
		91.0			3,165	
		93.0			3,244	
		95.0			3,301	maximum
	VV-N560	89.0			3,036	
		91.0			3,112	
		93.0			3,199	
		95.0			3,276	
		97.0			3,344	maximum
	MagPro	92.0			2,988	do not reduce
		94.0			3,044	
		96.0			3,111	
		98.0			3,149	
		100.0			3,218	
		102.0			3,267	
	IMR-7828	91.0			2,990	
		93.0			3,061	
		95.0			3,159	
		97.0			3,239	
		99.0			3,314	
225 Nosler Partition	RL-22	81.0	Lapua	3.540	2,766	
		83.0			2,833	
		85.0			2,880	
		87.0			2,955	
		89.0			3,015	
		91.0			3,072	
		93.0			3,130	
225 Nosler AccuBond	H-4831	82.0	Lapua	3.580	2,780	
		84.0			2,828	
		86.0			2,890	
		88.0			2,941	
		90.0			2,981	
		92.0			3,056	
		94.0			3,101	
		96.0			3,144	
225 Barnes TTSX	RL-19	80.0	HSM	3.565	2,944	
		82.0			2,982	

(Continued on page 50)

Various manufacturers' cases held between 111.2 to 114.9 grains of water when filled level with the case mouth. When filled to the bottom of the neck, capacity dropped to between 101.3 and 104.8 grains.

Cartridges that utilize .338-inch bullets have been popular for decades with examples including the .338 Winchester Magnum, .340 Weatherby Magnum, .338 Remington Ultra Mag, .338-378 Weatherby Magnum and others. These are primarily designed for hunting big game, and as a result, there is a wide variety of excellent bullets that are suitable for any practical purpose. With the exception of the Nosler 180-grain AccuBond, which was not available at press time, the lightest practical bullets are the Hornady 185-grain GMX and Barnes TSX, both of which are designed to give significant penetration for their comparatively light

(Continued from page 49)

weight. Due to lack of having enough quantities of either bullet on hand to develop proper handload data, they were necessarily omitted from the accompanying data, but each of the above bullets can be used with 200-grain bullet powder charges.

Having had extensive field experience with this caliber and with a variety of game, select general-purpose favorites include the Nosler 225- and 250-grain Partition, Barnes 225-grain TSX and TTSX and Swift 250-grain A-Frame. However, the Hornady 225- and 250-grain Spire Point, Nosler 225- and 250-grain AccuBond and Sierra 250-grain BTSP have proven effective on elk, moose and other thin-skinned game and cost significantly less. The Barnes 250-grain TSX is an outstanding bullet that offers impressive penetration that is both deep and straight, and stabilizes at any reasonable distance that big game will be taken in 9-, 10- and 12-inch twist barrels.

Being designed for long-range target work and military applications, the .338 LM thrives on match bullets with high ballistic coefficients (BC), with many excellent choices being offered. Examples from Hornady include the 250-grain BTHP Match and 285-grain BTHP Match with a G1 BC of .670 and .700, respectively. Both bullets yielded exceptional accuracy in the Savage rifle. Sierra offers its

Table II **.338 Lapua Magnum Handloading Data**

bullet (*grains*)	powder	charge (*grains*)	case	overall loaded length (*inches*)	velocity (*fps*)	comments
225 Barnes TTSX	RL-19	84.0	HSM	3.565	3,023	
		86.0			3,066	
		88.0			3,135	
		90.0			3,187	
		92.0			3,226	
	VV-N170	93.0			2,985	
		94.0			3,003	
		95.0			3,040	
		96.0			3,082	
		97.0			3,093	
		98.0			3,131	
		99.0			3,153	
	H-4831sc	85.0			2,978	
		87.0			3,018	
		89.0			3,066	
		91.0			3,133	
		93.0			3,190	
		95.0			3,224	
250 Speer Grand Slam	VV-N165	84.0	Nosler	3.500	2,686	
		86.0			2,742	
		88.0			2,790	
		90.0			2,866	
		92.0			2,918	
		94.0			2,970	
250 Nosler Partition	IMR-7828	83.0	Nosler	3.540	2,648	
		85.0			2,701	
		87.0			2,754	
		89.0			2,839	
		91.0			2,911	
		92.5			2,949	
250 Hornady BTHP Match	RL-22	80.0	Nosler	3.565	2,632	
		82.0			2,688	
		84.0			2,770	
		86.0			2,817	
		87.0			2,889	
		89.0			2,951	
	Retumbo	89.0			2,851	
		91.0			2,899	
		93.0			2,935	
		95.0			2,969	
	H-4831sc	82.0			2,785	
		84.0			2,828	
		86.0			2,895	
		88.0			2,935	
		90.0			2,976	
250 Sierra SBT	MagPro	87.0	HSM	3.575	2,777	do not reduce
		89.0			2,836	
		91.0			2,859	
		93.0			2,923	
	VV-N165	86.0			2,799	
		88.0			2,843	
		90.0			2,909	
		92.0			2,951	
		93.0			2,963	
285 Hornady BTHP	RL-22	72.9	HSM	3.625	2,325	
		76.8			2,417	
		80.7			2,538	
		84.6			2,641	
		86.5			2,723	

(Continued on page 51)

Above, assorted brass showed variances in how it handled .338 Lapua pressures. Right, NoslerCustom brass and Federal 215 Large Rifle Magnum primers were used for developing most of the load data.

250- and 300-grain HPBT MatchKing with .587 and .768 BC, respectively, with the latter version being especially popular with long-range competitors. Berger has gained an outstanding reputation with its competition bullets, including the 250- and 300-grain Match Hybrid with unusually high BCs of .682 and .818, respectively. Berger's Elite Hunter bullets in the same weight offer an identical BC. Either the Hybrid or Elite Hunter bullets can be used with 250- and 300-grain data; *just be certain to start at least 7 percent below maximum charges*. Barnes offers its 280-grain LRX BT with a BC of .667, but in spite of having a match-type profile, this is a hunting bullet that offers X-Bullet style expansion.

The best performing powders are generally found with a burn rate that falls between IMR-4350 and Vihtavuori N570, of which there are many. With 200-grain bullets, notable accuracy was obtained with Alliant Reloder 19, Vihtavuori N160 and Hodgdon H-4350, while Reloder 19 and H-4831SC were top choices with 225-grain bullets.

With 250-grain bullets, which are by far the most popular in this caliber, several powders could either duplicate or exceed factory load performance, including Vihtavuori N165, IMR-7828, Reloder 22, Hodgdon Retumbo, H-4831SC and Accurate MagPro. These are all top-quality powders and have the potential to offer extreme accuracy, but RL-22 and H-4831SC offered potentially the best accuracy. Moving up to 285- and 300-grain bullets, these same two powders again produced top-notch accuracy, as did VV-N560.

(Continued from page 50)

Table II **.338 Lapua Magnum Handloading Data**

bullet (*grains*)	powder	charge (*grains*)	case	overall loaded length (*inches*)	velocity (*fps*)
285 Hornady BTHP	W-780	74.9	HSM	3.625	2,410
		78.6			2,488
		82.2			2,600
		85.9			2,727
		87.7			2,804
	RL-25	77.2			2,391
		80.8			2,468
		84.3			2,561
		87.8			2,673
		89.6			2,748
300 Sierra HPBT MatchKing	VV-N560	76.7	HSM	3.680	2,502
		78.5			2,543
		80.2			2,591
		82.0			2,670
		83.7			2,711
	H-4831SC	76.2			2,464
		78.1			2,502
		80.0			2,579
		81.9			2,613
	RL-22	75.9			2,475
		77.6			2,500
		79.2			2,571
		80.9			2,602

Notes: A Savage Model 110 BA with a 26-inch barrel was used to fire all loads. Federal 215 Large Rifle Magnum primers were used throughout. Bullet diameter: .338 inch; maximum overall loaded length: 3.681 inches; maximum case length: 2.724 inches; trim-to length: 2.714 inches.

Be Alert – Publisher cannot accept responsibility for errors in published load data.

This four-shot group with Remington ammunition measures .782 inch and was fired at 200 yards from the Savage Model 110 BA test rifle.

To achieve proper powder ignition, a large rifle magnum primer is strongly suggested with Federal 215 being used here. The CCI 250 and Remington 9½ Magnum primers were cross-referenced and can be used as substitutions for all the accompanying load data.

Although its origins date back more than 30 years, with today's long-range sporting rifles and scientifically advanced bullets and optics, the .338 Lapua Magnum is well on its way to becoming widely popular. •