

RELOADING GUIDE for Centerfire Cartridges

1/2004



VIHTAVUORI

Burning Rate Chart

Current canister powders in order of *approximate* burning rate. This list is for reference only and **not** to be used for developing loads.

CONTACT YOUR LOCAL DEALER OR NAMMO LAPUA OY, www.nammo.com.

	Vihtavuori	Norma	RWS	VECTAN	PRB	IMR	Alliant	Hodgdon	Accurate	W-W	
Fast Burning	N310	R1	P805 P801	Ba10	PCL514 PCL504 PCL505 PCL505 PCL506			Clays Clays Int. HP38			
	N320					700X PB SR7625	Bullseye Red Dot Green Dot	Solo 1000 Trap100	No. 2	231 452	
	N330		P804 P803	Ba9	PCL501		Unique	Clays Universal HS-6	No. 5	473 540	
	N340					SR4756	Herco				
	3N37										
	N350										
	3N38						Blue Dot			571	
	N105							Hercules 2400	HS-7	No.7	
		R-123								No. 9	
	N110		P806 R910	S10 Tubal1	PCL512	SR4759 IMR4227			H110 H4198		296 680
	N120	200	R901				IMR4198	Reloader 7	H4227	MP 5744	
	N130	201		R902	Tubal2 Tubal3	PCL508 PCL507	IMR3031	Reloader 11		1680 2015	
	N133	202							H322 BL-(C)2 H335	2230 2460	748
	N530			R903			IMR4064 IMR4895	Reloader 12	H4895	2520	
	N140	203B	R907	Tubal4 Tubal5	PCL511		IMR4320		Varget H380	2700	
N540			Tubal6				Reloader15	H414 H4350		760	
N150		R904							4350		
N550			Tubal7			IMR4350	Reloader 19				
N160	204							H450			
N560	MRP	R905	Tubal8			IMR4831		H4831	3100	785	
N165	MRP(2)						Reloader 22				
N170						IMR7828		H1000	8700		
24N41								H870			
20N29								50BMG			
Slow Burning											

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Preface

Dear Vihtavuori customer,

The new Vihtavuori Reloading Guide 1/2004 for Centerfire Ammunition is an updated version of the previous Vihtavuori Reloading Guides. The contents of this new issue has been revised with loading data for the following popular calibres

- .270 Winchester Short Magnum
- .300 Winchester Short Magnum
- 7,62 x 25 Tokarev

Furthermore the loading data has been updated with many new premium-class hunting and match grade bullets. To keep the load data as current as possible, many obsolete bullets has been removed from the tables. As a courtesy to the reloader the load tables contain now notes of compressed loads and loads to fill the case up. For increased usability this new edition features data in both measuring systems i.e. charge weight in grams and grains as well as muzzle velocity in meters and feet per second.

A completely new feature in the Vihtavuori Reloading Guide is the accuracy loads noted in the load tables. These loads utilise world-wide well-known LAPUA cartridge components and are factory-tested either for even pressure/muzzle velocity characters or even grouping, or both. These loads are highlighted in the load tables by grey shadowing.

All the loads in this guide are pressure tested according to the CIP method. The maximum loads given in the tables are determined according to the CIP/SAAMI maximum pressure specifications, whichever is lower. The listed maximum loads must never be exceeded. Due to the differences in the cartridge components, individual weapons, shooting temperatures etc. always start developing your load by using the starting load according to the loading data. If there is no indication of the starting load, use 15 % lower charge than the listed maximum load as your starting load.

The Vihtavuori powders are manufactured by Nexplo Vihtavuori Oy in Vihtavuori plant. Sales and marketing of reloading powders as well as customer service are carried out by Nammo Lapua Oy. Contact details of our customer service and the list of Vihtavuori Distributors can be found in the back of this guide. For latest updates of data and distributors check also at www.vihtavuori.fi/ www.lapua.com, where this guide can also be downloaded in pdf-format.

We wish you successful reloading with Vihtavuori powders.



Rifle Powders

N100 series

The series N100 powders are primarily rifle powders, with suitable speeds to optimize handloading from the tiny .17 Remington and .22 Hornet all the way to the monster bashing .458 Winchester Magnum. There are ten speeds in this series and they include:

N110: This is a very fast burning propellant that can be used in applications which previously used Hercules 2400, Hodgdon H110, or Winchester 296. Typical applications include: .22 Hornet, .25-20 Winchester, .357 S&W Magnum, .357 Maximum, .44 Magnum, and .45 Winchester Magnum.

N 120: This speed needs higher pressure than N110 in order to optimize burning. Burning rate falls near the various 4227s. It works superbly with comparatively light bullets in .22 caliber cartridges. It is, by nature, a limited application propellant.

N130: Burning rate is between IMR4227 and the discontinued Winchester 680. This is the powder used in factory loaded .22 and 6mm PPC.

N133: This speed is very close to IMR 4198 in quickness. Thus, it is ideal for the .222 Remington, .223 Remington, and .45-70 Government and other applications where a relatively fast burning rifle propellant is needed.

N135: This is a moderate burning propellant. It will fit applications similar to Hercules Reloder 12, IMR-4895 or IMR 4064. Applications range from the .17 Remington to the .458 Winchester.

N140: This powder can usually be used in place of Hercules Reloder 15, IMR 4320, and Hodgdon H380. Applications include: .222 Remington Magnum, .22-250 Remington (factory powder), .30-30 Winchester, .308 Winchester, .30-06 Springfield, .375 H&H Magnum, and so on.

N150: This is a moderately slow powder that can help refine rifle cartridge ballistics when N140 is just a tad too fast and N160 is a tad too slow. Works well in many applications previously filled by 760, H414, and IMR 4350.

N160: A relatively slow powder ideally suited to many magnum and standard rounds requiring a slow propellant. It has characteristics that makes it work well for applications previously using various 4350's, Hercules Reloder 19, and the various 4831's. For example some ideal applications are: .243 Winchester, .25-06 Remington, .264 Winchester Magnum, .270 Winchester (factory load), 7mm Remington Magnum, .30-06 Springfield, .300 Winchester Magnum, .338 Winchester Magnum, .375 H&H Magnum, etc. This is destined to being one of our most popular powders.

N165: A very slow burning magnum propellant for use with heavy bullets. Applications begin very heavy bullets in the .30-06, and include the .338 Winchester Magnum.

N170: Our slowest speed N100-series propellant. Excellent for e. g. .300 Winchester Magnum heavy bullet loads.

N500 series

Adding nitroglycerol to the traditional single base powder makes possible in addition to geometry and coating a third controlled variable of ballistic properties: energy content. Vihtavuori calls powders which have nitroglycerol added (maximum 25 %) high energy NC-powders, which form N500 series.

Adding nitroglycerol to the high energy N500 series is done by impregnation. After that the grains are coated with a new type of chemical which results in very progressive burning characteristics.

The composition of a typical high energy powder is as follows:

- * nitrocellulose
- * coating agent
- * flame reducing agent
- * nitroglycerol
- * stabilizer
- * wear reducing agent

Geometrically the powders in the N500 series are equal to the N100 series. Although these new powders have a higher energy content, they do not cause greater wear to the gun. This is because the surface of the powder has been treated with an agent designed to reduce barrel wear. N500 series powders work well at different temperatures, even better than the traditional N100 and N300 series. Temperature sensitivity naturally depends very much on the weapon and on the cartridge. The manufacturing technique employed permits a very high bulk density, which in turn makes it possible to use a bigger charge in a certain limited loading volume.

Vihtavuori High Energy powders are available in for burning rates:

N530: Burning rate close to N135. Especially for .223 Remington. Excellent also for .45-70 Government.

N540: Burning rate like N140. Especially for .308 Winchester.

N550: Burning rate like N150. Especially for .308 Winchester and .30-06 Springfield.

N560: Burning rate like N160. Especially for .270 Winchester and 6.5 x 55 Swedish Mauser.

Powders For .50 BMG

For .50 BMG there are two special Vihtavuori powders available, 24N41 and 20N29. They are, like N100 series, single base surface treated powders. The burning rate of them is slower and their grain size is larger than that of the N100 series rifle powders. 24N41 is slightly faster burning than 20N29.

Handgun Powders

Handgun powders include five N300 series propellants and three special propellants:

N310: Very fast burning and competitive with Bullseye and Accurate No.2. It has applications in a very wide range from the .25 ACP to the 9mm Luger.

N320 is a handgun powder of comparatively fast burning rate. Useful in many popular cartridges. Currently available data includes 9mm Luger, .38 Special, .357 Magnum, .44 Magnum, .45 ACP and .45 (Long) Colt. Burning rate generally is perhaps a tad faster than 231 or generally about like Red Dot.

N330: This is a handgun powder that has a burning rate similar to Green Dot, No. 5, or PB. Data is currently available for 9mm Luger, .38 Special, .40 S&W, .44 S&W Special and .45 (Long) Colt.

N340: With a burning rate not dissimilar to Winchester 540 or Herco, this powder is a wide application type. Data for the following handgun cartridges is currently available: .30 Luger, 9mm Luger, .38 S&W (Colt New Police), .38 Super Auto, .38 Special, .357 Magnum, .44 Magnum, .45 Auto and .45 (Long) Colt.

N350: This is the slowest burning propellant in the N300 series. Burning speed is about like Blue Dot, "Hi-Skor" 800-X or No. 7. Data is currently available for: 9mm Luger, .38 Super Auto, .38 Special, .357 Magnum, .44 Magnum and .45 Auto.

3N37: Burning speed is between N340 and N350, close to "Hi-Skor" 800-X, and it therefore has applications also in handgun cartridges. Data is currently available for all popular handgun calibers. The characteristics of this propellant makes it very desirable for competitive handgun shooting.

3N38: A powder for the high velocity loads of the 9mm Luger and the .38 Super with moderate bullet weight. Designed specially for competitive handgun shooting.

N105 Super Magnum: This special powder has a burning rate between N350 and N110. It is especially developed for handgun cartridges with heavy bullets and/or large case volume. Reloading data is currently available for 9 x 21mm, .38 Super Auto, .357 Magnum, .40 S&W, 10mm Auto, .44 Remington Magnum and .45 Winchester Magnum.

About the Data

Disclaimer

As Nammo Lapua Oy has no control over improper storage, handling, loading or use of our powders after they have left the factory, we make no warranty of any kind, either expressed or implied, limited or full. We specifically disclaim all warranties of fitness for a particular purpose and merchantability. We specifically dis-

claim all liability for consequential damages of any kind whatsoever, whether or not due to seller's negligence or based on strict product liability or principle of indemnity or contribution, Nammo Lapua Oy neither assumes nor authorizes any person to assume for it any liability in connection with the use of this product.

How To Use The Data

Our rifle and handgun data listings generally contain maximum charges which are not to be exceeded. In some instances starting loads are also listed. Currently this booklet contains all of the data we can supply. Be certain you use the correct data and the specific bullet weight shown.

By staying 5 % below the maximum powder charge weight, pressures will be reduced by about 10 % while velocities will be only about 3 % lower than listed.

Caution: When loading handgun cartridges it is vital to maintain the minimum cartridge overall length (C.O.L.) listed in the tables. Shorter overall lengths may double chamber pressures. Longer lengths are permissible so long as the functioning of the handgun will not be impaired.

The data in the loading tables were obtained at an ambient temperature of 68 degrees Fahrenheit and relative humidity of 55 %. The values obtained were under carefully controlled conditions and may vary from those obtained with your firearm, specific component lots, loading dimensions, and loading procedures. The maximum charges must NEVER be exceeded. **Start loading with the starting load according to the loading data. If there is no indication of the starting load, use 15 % lower charge than the listed maximum.** When loading cartridges for which the listed charge is 10 grains or less, after firing 10 rounds at the minimum weight (15 % below maximum), increase charge weights by 0.2 grains and fire another 10 rounds. Repeat this procedure, if necessary, until you reach, but do not exceed, the maximum listed charge. The same process is followed for heavier charges except that charge weights from 11 to 25 grains use increments of 0.5 grains. For charges over 25 grains increments of 1.0 grains will be correct.

If even a single test round shows signs of excessive pressure discontinue the use of the load. Do not fire even a single additional cartridge. Seek qualified help before proceeding!

The traditional sign of overpressure is a flattened primer. When flattened primers start to occur, it is a definite warning that the charge should be reduced, quickly. Brass getting into the ejector and extractor cavities is a worse case. Blown out primers are worse still. If a case ruptures it may be a sign of a defective case or a truly lethal chamber pressure.

In case of overpressure signs it is wiser to back off, to be safe rather than sorry. Why risk potentially fatal injury? Better to stop shooting and immediately discard all such reloads.

Read also the Reloading Safety Rules on pages 9 and 10.

Pressure

There are numerous factors which can change the ballistic performance of a load even when the data is followed exactly. For example: The internal dimensions of a firearm can vary greatly even between two of the same make and model. Pressures can vary to extremes as different firearms are used. Each change in brand and even within different lots of a specific brand component can cause notable ballistic changes. Too, changes in ambient temperature can also cause ballistic altering pressures. Not every bullet of a given diameter and weight will produce alike pressure. Changes in case brand can also effect ballistics. There are numerous other causes of varying pressure levels.

Therefore it is essential that the reloader be well versed in the methods of carefully working up a reload powder charge in small increments as outlined in the various reloading handbooks that are available from reliable sources. The data in this book is not intended for use by persons not thoroughly versed in such procedures.

This guide must be supplemented by a good reloading handbook such as the Lapua Reloading Manual, the DBI Metallic Cartridge Reloading, the Vihtavuori Reloading Manual or other recognized manuals that may offer all appropriate information.

Properties of Smokeless Powder

Smokeless powders, or propellants, are essentially mixtures of chemicals designed to burn under controlled conditions at the proper rate to propel a projectile from a gun.

Smokeless powders are made in three forms:

1. Thin, circular flakes or wafers
2. Small cylinders
3. Small spheres

Single-base smokeless powders derive their main source of energy from nitrocellulose.

The energy released from double-base smokeless powders is derived from both nitrocellulose and nitroglycerine.

All smokeless powders are extremely flammable by design, they are intended to burn rapidly and vigorously when ignited.

Oxygen from the air is not necessary for the combustion of smokeless powders since they contain sufficient built-in oxygen to burn completely, even in an enclosed space such as the chamber of a firearm.

In effect, ignition occurs when the powder granules are heated above their ignition temperature. This can occur by exposing powder to:

1. A flame such as a match or primer flash.
2. An electrical spark or the sparks from welding, grinding, etc..

3. Heat from an electric hot plate or a fire directed or near a closed container even if the powder itself is not exposed to the flame.

When smokeless powder burns, a great deal of gas at high temperature is formed. If the powder is confined, this gas will create pressure in the surrounding structure. The rate of gas generation is such, however, that the pressure can be kept at a low level if sufficient space is available or if the gas can escape.

In this respect smokeless powder differs from blasting agents or high explosives such as dynamite or blasting gelatin, although smokeless powder may contain chemical ingredients common to some of these products.

High explosives such as dynamite are made to detonate, that is, to change from solid state to gaseous state with evolution of intense heat at such a rapid rate that shock waves are propagated through any medium in contact with them. Such shock waves exert pressure on anything they contact, and, as a matter of practical consideration, it is almost impossible to satisfactorily vent away the effects of a detonation involving any appreciable quantity of dynamite

Smokeless powder differs considerably in its burning characteristics from common "black powder".

Black powder burns essentially at the same rate out in the open (unconfined) as when in a gun.

When ignited in an unconfined state, smokeless powder burns inefficiently with an orange-colored flame. It produces a considerable amount of light brown noxious smelling smoke. It leaves a residue of ash and partially burned powder. The flame is hot enough to cause severe burns.

The opposite is true when it burns under pressure as in a cartridge fired in a gun. Then it produces very little smoke, a small glow, and leaves very little or no residue. The burning rate of smokeless powder increases with increased pressure.

If burning smokeless powder is confined, gas pressure will rise and eventually can cause the container to burst. Under such circumstances, the bursting of a strong container creates effects similar to an explosion.

For this reason, the Department of Transportation (formerly Interstate Commerce Commission) sets specifications for shipping containers for propellants and requires tests for loaded containers - under actual fire conditions - before approving them for use.

When smokeless powder in D.O.T. approved containers is ignited during such tests, container seams split open or lids pop off - to release gases and powder from confinement at low pressure.

How to Check Smokeless Powder for Deterioration

Although modern smokeless powders are basically free from deterioration under proper storage conditions, safe practices require a recognition of the signs of deterioration and its possible effects.

Powder deterioration can be checked by opening the cap on the container and smelling the contents.

Powder undergoing deterioration has an irritating acidic odor. (Don't confuse this with common solvent odors such as alcohol, ether and acetone).

Check to make certain that powder is not exposed to extreme heat as this may cause deterioration. Such exposure produces an acidity which accelerates further reaction and has been known, because of the heat generated by the reaction, to cause spontaneous combustion.

Never salvage powder from old cartridges and do not attempt to blend salvaged powder with new powder. Don't accumulate old powder stocks. The best way to dispose of deteriorated smokeless powder is to bum it out in the open at an isolated location in small shallow piles (not over 1" deep). The quantity burned in any one pile should never exceed one pound. Use an ignition train of slow burning combustible material so that the person may retreat to a safe distance before powder is ignited.

Considerations for Storage of Smokeless Powder

Smokeless powder is intended to function by burning, so it must be protected against accidental exposure to flame, sparks or high temperatures.

For these reasons, it is desirable that storage enclosures be made of insulating materials to protect the powder from external heat sources.

Once smokeless powder begins to burn, it will normally continue to burn (and generate gas pressure) until it is consumed.

D.O.T. approved containers are constructed to open up at low internal pressures to avoid the effects normally produced by the rupture or bursting of a strong container.

Storage enclosures for smokeless powder should be constructed in a similar manner:

1. Of fire-resistant and heat-insulating materials to protect contents from external heat.
2. Sufficiently large to satisfactorily vent the gaseous products of combustion which would result if the quantity of smokeless powder within the enclosure accidentally ignited.

If a small, tightly enclosed storage enclosure is loaded to capacity with containers of smokeless powder, the

walls of the enclosure will expand or move outwards to release the gas pressure - if the powder in storage is accidentally ignited.

Under such conditions, the effects of the release of gas pressure are similar or identical to the effects produced by an explosion.

Hence only the smallest practical quantities of smokeless powder should be kept in storage, and then in strict compliance with all applicable regulations and recommendations of the National Fire Protection Association.

Recommendations for Storage of Smokeless Powder

STORE IN A COOL, DRY PLACE. Be sure the storage area selected is free from any possible sources of excess heat and is isolated from open flame, furnaces, hot water heaters, etc. Do not store smokeless powder where it will be exposed to the sun's rays. Avoid storage in areas where mechanical or electrical equipment is in operation. Restrict from the storage areas heat or sparks which may result from improper, defective or overloaded electrical circuits.

DO NOT STORE SMOKELESS POWDER IN THE SAME AREA WITH SOLVENTS, FLAMMABLE GASES OR HIGHLY COMBUSTIBLE MATERIALS. STORE ONLY IN DEPARTMENT OF TRANSPORTATION APPROVED CONTAINERS.

Do not transfer the powder from an approved container into one which is not approved.

DO NOT SMOKE IN AREAS WHERE POWDER IS STORED OR USED. Place appropriate "NO SMOKING" signs in these areas.

DO NOT SUBJECT THE STORAGE CABINETSSHOULD BE CONSTRUCTED OF INSULATING MATERIALS AND WITH A WEAK WALL, SEAMS OR JOINTS TO PROVIDE AN EASY MEANS OF SELFVENTING.

DO NOT KEEP OLD OR SALVAGED POWDERS. Check old powders for deterioration regularly. Destroy deteriorated powders immediately.

OBEY ALL REGULATIONS REGARDING QUANTITY AND METHODS OF STORING. Do not store all your powders in one place. If you can, maintain separate storage locations. Many small containers are safer than one or more large containers.

KEEP YOUR STORAGE AND USE AREA CLEAN. Clean up spilled powder promptly. Make sure the surrounding area is free of trash or other readily combustible materials.

The above information has been provided with permission from SAAMI: SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE, INC. P.O. Box 838, Branford, CT 06405.

Reloading Safety

Reloading is an enjoyable and rewarding hobby that is easily conducted with safety. But like many other human endeavours, carelessness or negligence can make reloading hazardous. The essence of reloading safety is proper handling and storage of primers and powder. As important is strict following of the instructions given by the manufacturers of the reloading equipment as well as the reloading components.

Before you get started, read the safety rules below and keep them in mind whenever reloading. Attention paid to detail and patience ensures safety and quality!

- Reload only when you can give it your undivided attention. **Do not reload**, when fatigued or ill. Develop your own reloading routine to avoid mistakes. Avoid haste, load at a leisurely place and keep in mind that **absolutely no reloading under the influence of alcohol or drugs!**
- Always wear proper eye protection. It is an unnecessary risk to reload without safety glasses.
- Store powder and primers out of reach of children and away from heat and open fire. **Follow the manufacturer's instructions on your powder canister. Never smoke during a reloading session!**
- Keep no more powder than needed available. Immediately return the unused powder to its original factory container to preserve its identity and usable life time.
- Do not use any powder unless its identity is positively known. Scrap all unidentified powders according to the manufacturer's instructions on your powder canister. **Keep in mind that the trial-and-error method may lead to serious injury!**
- **Do not store primers in bulk! Doing so will create a bomb!** Bulk primers will very likely mass detonate. The blast of a few hundred primers corresponds to a hand grenade in a room! Do not force primers in any circumstances. Take special care when filling and handling auto primer feed tubes. Keep primers in their original factory packing until used. Return unused primers to their original packing.
- Do not use primers if their identity is lost. Discard them according to the manufacturer's instructions.
- Start loading with the starting load according to the loading data. If there is no indication of the starting load, use 15 % lower charge than the listed maximum load. Increase the charge using small steps watching for overpressure signs from the primer and the case head at each step. **If you detect overpressure signs immediately stop shooting and reduce the charge.** Disassemble always the defected cartridges. **NEVER EXCEED THE MAXIMUM LOADS!**
- Check visually the powder level in the cases so you are absolutely sure that you have no double powder charge. When a double powder charge is fired it may result in a gun damage, personal injury, even death.
- If you change the lot of any component or if you change any of the components of your reload, you must develop your load from the starting load again. A different component as well as a component from a different manufacturing lot may cause changes in cartridge pressure.
- You must absolutely follow the given cartridge overall lengths (C.O.L.) according to the reloading tables. The change in the bullet seating depth has a significant influence on the cartridge pressure.
- **Never reduce loads under the listed starting load.**
- Keep your reloading bench in good order. Clean up spilled powder and primers promptly and completely. Remember that the reloading bench is not a temporary store for other tools, used car spare parts etc.
- Use your reloading equipment according to the manufacturer's recommendations. Study the instructions carefully and don't hesitate to ask, if you don't understand everything.
- **Be safe, be conscientious!**

Reloading Safety

LEAD EXPOSURE

A continuous lead exposure has been found out to create lead accumulation to living bodies, specially to the nervous system causing little by little serious physical impairment. Some unused reloading components as well as fired cases can contain lead or lead compounds, it is possible to a reloader to get exposed during reloading. Primers and bullets contain lead and it may be present as a residue in fired cartridge cases, too.

There are different ways lead may enter the body. However, the two most common are considered to be the mouth and the breathing. Therefore with simple precautions described underneath the possible lead exposure and its dangerous consequences can be avoided.

- **WASH YOUR HANDS** thoroughly with warm water and soap after shooting or reloading.
- **DO NOT EAT OR DRINK** during a reloading session. When handling fired cartridge cases the residual containing lead most likely gets to your hands. Therefore eating something requiring a straight hand contact during a reloading session hazards the reloader to lead exposure. Keep your hands away from your nose or your mouth during a reloading session.
- **KEEP GOOD HOUSEHOLD AT YOUR RELOADING SITE.** Regular cleaning prevents the accumulation of residuals. Use a damp cloth or mop to clean up the reloading bench as well as the floor underneath. **DO NOT USE A VACUUM CLEANER!** The use of it dues to a potential risk of exposure because of spilled powder it collects up. Furthermore an ordinary vacuum cleaner more spreads than collects up the dust containing residuals. Do not use any carpet at your reloading site. Carpet is hard to keep dust-free and it can create static electricity that can accidentally fire a primer.
- **PROTECT YOUR BREATHING AGAINST THE DUST IN THE RELOADING AREA.** When using a dry cleaning media in tumbling the cartridge cases keep in mind that the lead residual from the fired cases moves to the dry cleaning media, where it accumulates by use. Wear always a dust mask when pouring the dry cleaning media out of the tumbler and be careful not to spill the media on your reloading bench.

HANDGUN RELOADING DATA

DISCLAIMER

All of this reloading information has been provided by Nammo Lapua Oy. The data given here were obtained in laboratory conditions following strictly the CIP (Commission Internationale Permanente) June 13, 1990 and November 9, 1993 rules. The listed maximum loads have been determined according to the respective CIP/SAAMI maximum pressure specification, whichever is lower.

These test methods have been deemed to be safe throughout the world. Pressure is measured at the case mouth or from inside the case according to the CIP.

DO NOT ATTEMPT ANY EXTRAPOLATIONS. PLEASE FOLLOW THE DATA AS WRITTEN.

IT IS A MUST FOR EVERY RELOADER TO READ THE RELOADING SAFETY RULES ON THE PAGES 9 AND 10 OF THIS GUIDE.

7mm TCU

Test barrel: 360 mm (14"), 1 in 10" twist

Primers: Small Rifle

Cases: Necked-up LAPUA .223 Rem., trim-to length 44.50 mm (1.752")

Bullet		Powder		Starting load				Maximum load						
Weight [g]	Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity		
			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]	
6,5	100	HP	Hornady	62,5	2,461	N120	1,48	22,8	667	2 188	1,64	25,3	744	2 441
						N130	1,62	25,0	672	2 205	1,79	27,7	753	2 470
						N133	1,77	27,3	695	2 280	1,96	30,2	774	2 539
7,8	120	SSSP	Hornady	63,5	2,500	N120	1,32	20,4	606	1 988	1,45	22,4	655	2 149
						N130	1,45	22,4	610	2 001	1,61	24,9	673	2 208
						N133	1,62	25,0	630	2 067	1,81	27,9	701	2 300
8,4	130	Spitzer	Speer	65,0	2,559	N120	1,24	19,1	542	1 778	1,38	21,3	596	1 955
						N130	1,40	21,6	573	1 880	1,55	23,9	626	2 054
						N133	1,46	22,5	576	1 890	1,62	25,0	633	2 077
9,7	150	SBT	Sierra	65,0	2,559	N120	1,17	18,0	513	1 683	1,30	20,0	562	1 844
						N130	1,31	20,2	535	1 755	1,45	22,4	586	1 923
						N133	1,38	21,2	542	1 778	1,53	23,6	599	1 965
10,4	160	SBT	Sierra	66,0	2,598	N135	1,44	22,2	538	1 765	1,60	24,8	597	1 959
						N120	1,12	17,3	480	1 575	1,25	19,3	531	1 742
						N130	1,26	19,5	505	1 657	1,41	21,7	558	1 831
						N133	1,31	20,2	511	1 677	1,45	22,4	559	1 834
						N135	1,45	22,4	531	1 742	1,61	24,9	582	1 909
						N540	1,48	22,9	544	1 785	1,63	25,2	598	1 962

NOTE: This cartridge is not supported by CIP or SAAMI. The maximum loads do not exceed 320 MPa.

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!
LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

7mm BR Remington

Test barrel: 375 mm (14½"), 1 in 10" twist
 Primers: Small Rifle
 Cases: Remington, trim-to length 38.40 mm (1.512")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
6,5	100	HP	Hornady	56,0	2,205	N120	1,82	28,0	774	2539	1,93	29,8	829	2720
						N130	1,97	30,5	783	2568	2,10	32,4	838	2749
7,8	120	SSSP	Hornady	56,6	2,228	N120	1,67	25,8	687	2255	1,80	27,8	738	2421
						N130	1,81	27,9	707	2318	1,94	29,9	784	2572
						N133	1,94	30,0	714	2343	2,11	32,6	771	2530
9,1	140	Ballistic Tip	Nosler	60,3	2,374	N120	1,45	22,4	595	1954	1,58	24,4	640	2100
						N130	1,62	25,0	612	2006	1,73	26,7	661	2169
						N133	1,71	26,3	623	2044	1,84	28,4	671	2201
						N120	1,42	21,9	576	1890	1,54	23,8	619	2031
9,7	150	Ballistic Tip	Nosler	60,3	2,374	N130	1,54	23,8	589	1931	1,67	25,8	635	2083
						N133	1,62	25,1	595	1952	1,77	27,3	642	2106
						N135	1,75	27,0	606	1988	1,87	28,9	650	2133
						N120	1,30	20,1	539	1770	1,42	21,9	580	1903
10,4	160	HPBT	Sierra	59,7	2,350	N130	1,42	21,9	559	1834	1,55	23,9	602	1975
						N133	1,56	24,1	575	1886	1,69	26,1	619	2031
						N135	1,67	25,8	588	1929	1,79	27,6	630	2067

7mm GJW

Test barrel: 380 mm (15"), 1 in 8" twist
 Primers: Small Rifle
 Cases: Thune, trim-to length 48.80 mm (1.920")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
9,7	150	Ballistic Tip	Nosler	75,0	2,953	N130	1,58	24,4	613	2013	1,67	25,8	642	2106
						N133	1,65	25,5	614	2013	1,74	26,8	644	2113
						N135	1,78	27,5	629	2065	1,86	28,7	658	2159
10,9	168	HPBT	Sierra	75,0	2,953	N130	1,54	23,7	583	1913	1,63	25,2	611	2005
						N133	1,62	25,1	587	1927	1,71	26,4	617	2024
						N135	1,76	27,1	605	1984	1,83	28,2	631	2070
						N140	1,83	28,2	607	1991	1,91	29,5	636	2087

7,62 x 25 Tokarev

Test barrel: 150 mm (6"), 1 in 10" twist, groove calibre 7,85 mm (0,309")
 Primers: Large Pistol
 Cases: Focchi 7,63 Mauser, trim-to length 24,80 mm (0,976")

NOTE: FOR FIREARMS CHAMBERED FOR THE 7,62 x 25 TOKAREV CARTRIDGE ONLY.

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
3,9	60	HP ¹⁾	Speer	32,0	1,260	N320	0,29	4,4	391	1284	0,36	5,5	480	1574
						N340	0,39	5,9	434	1425	0,46	7,1	522	1713
4,6	71	FMJ ¹⁾	Sierra	33,0	1,299	N340	0,36	5,5	410	1345	0,43	6,7	478	1569
						3N37	0,39	6,0	412	1352	0,49	7,6	493	1616
						3N38	0,53	8,1	471	1546	0,61	9,5	521	1708

¹⁾ Bullet cal. 7,92 mm (0,312")

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!
 LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

7,62 x 25 Tokarev

Test barrel: 150 mm (6"), 1 in 10" twist, groove calibre 7,85 mm (0,309")
 Primers: Large Pistol
 Cases: Fioocchi 7,63 Mauser, trim-to length 24,80 mm (0,976")

NOTE: FOR FIREARMS CHAMBERED FOR THE 7,62 x 25 TOKAREV CARTRIDGE ONLY.

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
4,8	74	FMJ ¹⁾	LAPUA	33,0	1,299	N340	0,35	5,5	406	1331	0,43	6,6	471	1546
						3N37	0,39	5,9	403	1322	0,49	7,6	478	1569
5,8	90	JHC ²⁾	Sierra	32,5	1,280	N340	0,29	4,5	308	1011	0,37	5,7	405	1329
						3N37	0,34	5,2	340	1116	0,43	6,6	416	1366
						3N38	0,46	7,1	404	1326	0,53	8,1	452	1482
6,0	93	FMJ ¹⁾	LAPUA	34,0	1,339	N340	0,31	4,7	342	1122	0,39	5,9	401	1316
						3N37	0,33	5,1	349	1146	0,46	7,1	418	1370
						3N38	0,43	6,6	378	1241	0,56	8,6	445	1460

¹⁾ Bullet cal. 7,84 mm (0,309")

²⁾ Bullet cal. 7,92 mm (0,312")

.32 S.&W. Long N.P.

Test barrel: 175 mm (7"), 1 in 18½" twist
 Primers: Small Pistol
 Cases: LAPUA, trim-to length 23.20 mm (.913")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
5,4	83	LWC	LAPUA	24,6	0,969	N310	0,09	1,5	231	758	0,11	1,7	258	846
6,4	98	LWC	LAPUA	24,6	0,969	N310	0,07	1,1	186	610	0,08	1,3	208	682
6,4	98	LRN	LAPUA	32,3	1,272	N310	0,12	1,9	256	840	0,14	2,2	277	909

.32 S.&W. Long Wadcutter

Test barrel: 150 mm (6"), 1 in 18¾" twist
 Primers: Small Pistol
 Cases: LAPUA, trim-to length 23.20 mm (.913")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
5,4	83	LWC	LAPUA	24,6	0,969	N310	0,11	1,7	246	807	0,13	2,0	286	938
6,4	98	LWC	LAPUA	24,6	0,969	N310	0,09	1,4	233	764	0,12	1,9	257	843

9mm Luger

Test barrel: 100 mm (4"), 1 in 10" twist
 Primers: Small Pistol
 Cases: LAPUA, trim-to length 19,00 mm (0,748")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
5,8	90	HP-XTP	Hornady	27,0	1,063	N310	0,26	3,9	369	1212	0,27	4,2	384	1260
						N320	0,31	4,8	401	1316	0,34	5,3	421	1380
						N330	0,36	5,6	420	1379	0,39	6,1	439	1440
						N340	0,36	5,5	423	1387	0,40	6,2	452	1483
						N350	0,42	6,4	424	1391	0,47	7,2	456	1496
						3N37	0,42	6,4	437	1434	0,47	7,2	461	1512
6,5	100	HP	Speer	27,5	1,083	N320	0,30	4,7	373	1222	0,33	5,1	398	1307
						N330	0,35	5,4	393	1290	0,38	5,9	416	1365
						N340	0,37	5,7	393	1290	0,42	6,4	429	1407
						3N37	0,42	6,4	398	1306	0,47	7,3	434	1423

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!
 LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

9mm Luger

Test barrel: 100 mm (4"), 1 in 10" twist

Primers: Small Pistol

Cases: LAPUA, trim-to length 19,00 mm (0,748")

Bullet		Mfg.	C.O.L.		Powder Type	Starting load				Maximum load				
Weight [g]	Weight [grs]		Type	[mm]		[in.]	Weight [g]	Weight [grs]	Velocity [m/s]	Velocity [fps]	Weight [g]	Weight [grs]	Velocity [m/s]	Velocity [fps]
7,5	115	HP-XTP	Hornady	29,0	1,142	N320	0,26	4,0	341	1118	0,29	4,5	362	1188
						N330	0,31	4,8	356	1166	0,35	5,4	381	1251
						N340	0,34	5,2	365	1198	0,38	5,9	397	1301
						3N37	0,39	6,0	370	1214	0,44	6,7	398	1305
						N350	0,38	5,9	373	1225	0,42	6,4	396	1299
7,5	115	RN	Rainier	29,0	1,142	N320	0,25	3,9	326	1068	0,28	4,4	347	1139
						N330	0,30	4,7	342	1123	0,33	5,1	361	1185
						N340	0,32	5,0	353	1157	0,35	5,4	374	1228
						N350	0,37	5,7	364	1195	0,41	6,4	391	1282
						3N37	0,39	6,1	364	1195	0,42	6,5	383	1256
7,8	120	CEPP	LAPUA	28,7	1,130	N320	0,25	3,9	308	1012	0,28	4,3	331	1085
						N330	0,30	4,7	339	1113	0,33	5,1	362	1188
						N340	0,32	4,9	346	1135	0,36	5,5	370	1214
						N350	0,38	5,9	358	1174	0,41	6,4	383	1256
						3N37	0,36	5,6	339	1113	0,39	6,1	363	1189
8,0	124	LSWC	Intercast	29,0	1,142	N320	0,24	3,8	327	1073	0,27	4,1	343	1125
						N330	0,28	4,4	345	1131	0,31	4,8	358	1175
						N340	0,30	4,7	346	1136	0,33	5,1	369	1211
						3N37	0,35	5,4	352	1156	0,38	5,9	371	1218
						N350	0,32	5,0	346	1134	0,35	5,4	363	1191
8,0	124	FMJ/FP	Hornady	29,0	1,142	N320	0,25	3,9	310	1017	0,28	4,3	334	1096
						N330	0,31	4,8	338	1108	0,34	5,2	359	1178
						N340	0,34	5,3	347	1139	0,37	5,7	370	1214
						3N37	0,39	6,1	357	1172	0,42	6,5	377	1236
						N350	0,35	5,4	349	1144	0,39	6,0	370	1214
8,0	124	RN	Rainier	29,0	1,142	N320	0,24	3,8	305	1000	0,27	4,1	326	1069
						N330	0,27	4,2	324	1063	0,30	4,7	344	1129
						N340	0,30	4,7	328	1077	0,33	5,1	351	1152
						N350	0,34	5,2	340	1115	0,38	5,9	364	1196
						3N37	0,35	5,4	346	1136	0,39	6,0	365	1199
8,4	130	FMJ	Sierra	29,0	1,142	N320	0,23	3,6	299	981	0,26	4,0	319	1046
						N330	0,26	4,0	314	1031	0,29	4,5	333	1094
						N340	0,28	4,4	325	1066	0,31	4,8	341	1119
						N350	0,33	5,2	330	1083	0,36	5,5	346	1135
						3N37	0,32	4,9	325	1067	0,36	5,5	344	1130
9,4	145	LRN	Intercast	29,0	1,142	N105	0,45	7,0	351	1151	0,48	7,4	375	1232
						N330	0,22	3,5	285	935	0,25	3,8	305	1000
						N340	0,25	3,9	299	982	0,28	4,3	318	1044
						N350	0,27	4,2	296	972	0,30	4,7	319	1047
						3N37	0,29	4,5	299	982	0,32	5,0	322	1055
9,5	147	HP/XTP	Hornady	29,0	1,142	N330	0,25	3,9	294	964	0,28	4,3	315	1032
						N340	0,25	3,9	289	948	0,28	4,3	309	1015
						3N37	0,30	4,7	298	979	0,33	5,1	321	1052
						N350	0,29	4,5	302	991	0,32	5,0	326	1070
						N105	0,40	6,1	317	1039	0,41	6,4	338	1108
						3N38	0,41	6,3	357	1171	0,45	6,9	368	1207

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!

LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

9mm Luger

Test barrel: 100 mm (4"), 1 in 10" twist
 Primers: Small Pistol
 Cases: LAPUA, trim-to length 19,00 mm (0,748")

Bullet						Powder	Starting load				Maximum load			
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
9,5	147	RN	Rainier	29,0	1,142	N330	0,22	3,5	272	893	0,25	3,8	287	942
						N340	0,24	3,8	272	892	0,27	4,1	293	960
						N350	0,27	4,2	285	935	0,30	4,7	309	1014
						3N37	0,29	4,5	286	937	0,32	4,9	307	1008
9,7	150	CEPP	Lapua	28,7	1,130	N330	0,23	3,5	264	867	0,24	3,8	283	929
						N340	0,24	3,8	275	903	0,27	4,1	294	966
						N350	0,27	4,2	285	936	0,30	4,6	304	997
						3N37	0,27	4,2	275	904	0,30	4,7	298	976

9mm x 21

Test barrel: 140 mm (5½"), 1 in 10" twist
 Primers: Small Pistol
 Cases: Tanfoglio, trim-to length 21.00 mm (.826")

Bullet						Powder	Starting load				Maximum load			
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
6,5	100	HP	Speer	29,0	1,142	N340	0,39	5,9	416	1363	0,43	6,6	444	1455
						3N37	0,43	6,7	427	1400	0,48	7,4	453	1485
						N350	0,46	7,0	433	1420	0,50	7,6	459	1505
7,5	115	FMJ	Sierra	29,5	1,161	N340	0,35	5,3	381	1248	0,38	5,9	401	1314
						3N37	0,39	5,9	375	1229	0,43	6,6	402	1319
						N350	0,39	5,9	388	1274	0,43	6,6	410	1346
						N105	0,53	8,1	410	1344	0,57	8,7	438	1435
8,0	123	FMJ	LAPUA	29,5	1,161	N340	0,31	4,7	348	1142	0,34	5,2	364	1194
						3N37	0,35	5,3	354	1160	0,39	5,9	372	1222
						N350	0,35	5,3	348	1143	0,38	5,9	370	1213
						N105	0,45	6,9	372	1220	0,48	7,4	397	1301
9,5	147	HP-XTP	Hornady	29,5	1,161	3N37	0,32	4,9	310	1016	0,34	5,3	329	1079
						N350	0,30	4,6	324	1064	0,32	5,0	338	1110
						N105	0,38	5,8	326	1071	0,41	6,3	347	1139

9 x 23 Winchester

Test barrel: 130 mm (5"), 1 in 16" twist
 Primers: Small Pistol
 Cases: Winchester, trim-to length 22.75 mm (0.896")

Bullet						Powder	Starting load				Maximum load			
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
7,5	115	FMJ	Sierra	32,5	1,280	N340	0,41	6,3	425	1395	0,46	7,2	449	1474
						3N37	0,47	7,3	424	1392	0,54	8,3	462	1517
						N350	0,48	7,4	419	1374	0,57	8,8	456	1496
8,0	123	FMJ	LAPUA	32,5	1,280	N340	0,38	5,9	384	1261	0,45	6,9	422	1385
						3N37	0,43	6,6	397	1302	0,48	7,5	427	1400
						N350	0,45	6,9	388	1272	0,50	7,8	425	1394
8,0	123	Megashock	LAPUA	30,2	1,189	N340	0,37	5,7	382	1254	0,42	6,5	419	1373
						N350	0,44	6,8	391	1282	0,48	7,3	423	1386
						3N37	0,41	6,4	391	1281	0,50	7,7	432	1416
8,5	130	RN B	Rainier	32,5	1,280	N340	0,37	5,7	366	1202	0,41	6,3	401	1315
						3N37	0,43	6,6	377	1238	0,48	7,5	412	1351
						N350	0,40	6,1	361	1184	0,47	7,3	405	1328

NOTE: This cartridge is not supported by CIP or SAAMI. The maximum loads do not exceed 300 MPa.

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!
 LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

.357 SIG

Test barrel: 130 mm (5"), 1 in 16" twist

Primers: Small Pistol

Cases: Starline, trim-to length 21.80 mm (0.858")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
6,2	95	FMJ	Sierra	30,5	1,201	N340	0,51	7,8	461	1512	0,58	8,9	504	1652
						3N37	0,56	8,7	469	1539	0,65	10,0	514	1686
						N350	0,57	8,8	469	1537	0,66	10,1	518	1699
7,5	115	FMJ	Sierra	30,5	1,201	N340	0,41	6,3	404	1325	0,50	7,7	449	1473
						3N37	0,49	7,5	416	1365	0,56	8,6	458	1502
						N350	0,47	7,3	411	1347	0,56	8,6	460	1509
8,0	123	FMJ	LAPUA	30,5	1,201	N340	0,39	6,0	381	1250	0,48	7,4	426	1398
						3N37	0,47	7,2	392	1287	0,54	8,3	436	1431
						N350	0,47	7,2	394	1293	0,54	8,3	439	1440
8,0	123	Megashock	LAPUA	30,5	1,201	N340	0,39	6,0	381	1249	0,48	7,4	427	1400
						3N37	0,45	7,0	393	1291	0,54	8,3	437	1435
						N350	0,45	6,9	389	1276	0,54	8,4	440	1445
8,5	130	RN B	Rainier	30,5	1,201	N340	0,40	6,1	370	1213	0,46	7,1	409	1343
						3N37	0,46	7,1	381	1249	0,52	8,1	405	1330
						N350	0,44	6,8	383	1257	0,53	8,1	428	1404

.38 Super Auto

Test barrel: 140 mm (5½"), 1 in 16" twist

Primers: Small Pistol

Cases: Remington +P, trim-to length 22.70 mm (.893")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
7,5	115	HP-XTP	Hornady	31,5	1,240	N320	0,33	5,1	362	1 188	0,38	5,9	402	1 319
						N340	0,39	6,0	381	1 250	0,45	6,9	426	1 398
						3N37	0,42	6,5	385	1 263	0,51	7,9	436	1 430
						N350	0,36	5,5	357	1 171	0,46	7,1	415	1 362
7,5	115	FMJ	Sierra	32,4	1,276	N350	0,51	7,9	414	1 358	0,59	9,1	463	1 519
						3N37	0,48	7,5	395	1 296	0,54	8,4	443	1 453
7,5	115	RN	Rainier	31,5	1,240	N320	0,31	4,8	357	1 171	0,37	5,7	394	1 293
						N340	0,39	6,0	382	1 253	0,45	7,0	426	1 398
						N350	0,43	6,6	388	1 273	0,52	7,9	438	1 437
						3N37	0,44	6,9	390	1 280	0,51	7,9	432	1 417
8,0	124	FMJ-FP	Hornady	32,0	1,260	N320	0,30	4,7	330	1 083	0,35	5,4	366	1 201
						N340	0,39	6,0	368	1 207	0,46	7,1	413	1 355
						3N37	0,46	7,1	374	1 227	0,50	7,7	401	1 316
						N350	0,41	6,4	366	1 201	0,49	7,5	411	1 348
						N105	0,64	10,0	429	1 407	0,71	10,9	486	1 594
8,0	124	LSWC	Intercast	32,0	1,260	N320	0,26	4,0	334	1 096	0,32	5,0	369	1 211
						N340	0,35	5,4	367	1 204	0,41	6,4	405	1 329
						N350	0,39	6,0	371	1 217	0,46	7,1	415	1 362
						3N37	0,41	6,3	377	1 237	0,48	7,4	417	1 368
8,4	130	FMJ	Sierra	32,0	1,260	N320	0,27	4,2	317	1 040	0,33	5,1	354	1 161
						N340	0,36	5,5	349	1 145	0,41	6,3	384	1 260
						3N37	0,41	6,3	360	1 181	0,47	7,3	399	1 309
						N105	0,60	9,3	402	1 319	0,65	10,1	444	1 457
8,4	130	RN	Rainier	32,0	1,260	N320	0,29	4,4	312	1 024	0,33	5,2	350	1 148
						N340	0,35	5,4	344	1 129	0,40	6,2	375	1 230
						N350	0,38	5,9	347	1 138	0,45	6,9	388	1 273
						3N37	0,41	6,3	355	1 165	0,47	7,2	392	1 286

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!

LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

.38 Super Auto

Test barrel: 140 mm (5½"), 1 in 16" twist

Primers: Small Pistol

Cases: Remington +P, trim-to length 22.70 mm (.893")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Weight		Velocity		Weight		Velocity		
[g]	[grs]			[mm]	[in.]	[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]	
9,4	145	LRN	Intercast	32,0	1,260	N340	0,28	4,3	315	1 033	0,33	5,2	350	1 148
						3N37	0,36	5,5	329	1 079	0,41	6,3	368	1 207
						N350	0,33	5,1	319	1 047	0,39	6,0	358	1 175
9,5	147	HP/XTP	Hornady	32,0	1,260	N340	0,33	5,1	315	1 033	0,38	5,9	354	1 161
						3N37	0,38	5,9	334	1 096	0,44	6,8	372	1 220
						N350	0,37	5,7	327	1 073	0,42	6,5	364	1 194
9,5	147	RN	Rainier	32,0	1,260	N105	0,51	7,8	360	1 181	0,55	8,4	394	1 293
						N340	0,32	5,0	321	1 053	0,37	5,7	348	1 142
						N350	0,34	5,3	307	1 007	0,40	6,1	345	1 132
						3N37	0,36	5,5	316	1 037	0,41	6,3	349	1 145

.38 Super LAPUA

Test barrel: 140 mm (5½"), 1 in 16" twist

Primers: Small Pistol

Cases: LAPUA, trim-to length 22.70 mm (.893")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Weight		Velocity		Weight		Velocity		
[g]	[grs]			[mm]	[in.]	[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]	
7,5	115	FMJ	LAPUA	31,5	1,240	N340	0,40	6,2	373	1 224	0,44	6,8	406	1 330
						3N37	0,47	7,3	379	1 243	0,52	8,0	415	1 361
						3N38	0,60	9,3	413	1 355	0,68	10,4	454	1 489
8,0	123	FMJ	LAPUA	32,0	1,260	N340	0,39	6,0	357	1 171	0,43	6,7	387	1 270
						3N37	0,47	7,3	372	1 220	0,52	8,0	402	1 319
						3N38	0,57	8,8	394	1 293	0,62	9,6	434	1 424
8,4	130	FMJ	Sierra	32,0	1,260	N340	0,38	5,9	347	1 138	0,41	6,4	376	1 234
						3N37	0,46	7,1	360	1 181	0,50	7,7	392	1 285
						3N38	0,53	8,2	373	1 224	0,58	8,9	411	1 350

.38 Special

Test barrel: 170 mm (6½"), 1 in 18" twist

Primers: Small Pistol

Cases: LAPUA, trim-to length 29.10 mm (1.146")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Weight		Velocity		Weight		Velocity		
[g]	[grs]			[mm]	[in.]	[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]	
7,1	110	HP/XTP	Hornady	36,5	1,437	N320	0,35	5,4	342	1120	0,40	6,1	388	1272
						N340	0,40	6,2	345	1130	0,45	6,9	386	1267
						3N37	0,48	7,3	353	1156	0,53	8,2	399	1308
						N350	0,43	6,6	355	1165	0,50	7,7	398	1305
8,0	124	LSWC	Intercast	36,5	1,437	N320	0,29	4,5	310	1015	0,34	5,2	353	1159
						N340	0,37	5,7	324	1063	0,42	6,4	367	1203
						3N37	0,41	6,3	329	1079	0,46	7,0	367	1205
8,1	125	FP/XTP	Hornady	36,5	1,437	N350	0,39	5,9	336	1101	0,44	6,8	370	1215
						N320	0,32	4,9	299	981	0,37	5,6	342	1121
						N340	0,38	5,8	318	1042	0,43	6,7	359	1178
8,1	125	FP	Rainier	36,5	1,437	3N37	0,44	6,8	319	1045	0,49	7,5	367	1204
						N350	0,42	6,5	323	1058	0,49	7,5	373	1224
						N320	0,29	4,5	293	960	0,34	5,2	332	1089
						N340	0,34	5,2	306	1002	0,41	6,3	349	1146
						N350	0,38	5,9	304	997	0,45	6,9	354	1160
						3N37	0,40	6,2	310	1017	0,47	7,2	362	1187

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!

LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

.38 Special

Test barrel: 170 mm (6½"), 1 in 18" twist

Primers: Small Pistol

Cases: LAPUA, trim-to length 29.10 mm (1.146")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
9,1	140	HP	Speer	36,5	1,437	N320	0,30	4,6	268	878	0,35	5,3	320	1051
						N340	0,36	5,6	275	902	0,41	6,2	329	1079
						3N37	0,41	6,2	282	925	0,46	7,1	341	1117
						N350	0,40	6,2	282	925	0,45	6,9	336	1102
						N320	0,25	3,9	270	886	0,30	4,6	306	1004
9,4	145	LSWC	Intercast	37,5	1,476	N340	0,33	5,1	295	966	0,38	5,8	341	1118
						3N37	0,36	5,5	287	940	0,39	6,0	328	1077
						N350	0,35	5,4	296	969	0,42	6,4	346	1136
						N340	0,30	4,6	261	856	0,35	5,4	306	1004
9,5	146	JHP	Speer	35,0	1,378	3N37	0,35	5,4	263	863	0,40	6,1	310	1018
						N350	0,34	5,2	265	869	0,39	5,9	308	1010
						N320	0,20	3,0	237	776	0,23	3,5	267	876
9,6	148	LWC	Sako	30,0	1,181	N330	0,22	3,3	239	784	0,25	3,8	277	910
						N340	0,24	3,6	248	812	0,27	4,1	282	926
						N350	0,27	4,1	255	835	0,30	4,6	294	964
10,2	158	HP	Speer	36,5	1,437	N320	0,25	3,9	218	715	0,30	4,6	272	892
						N340	0,32	4,9	241	791	0,37	5,6	300	983
						3N37	0,38	5,9	259	848	0,43	6,6	305	999
						N350	0,36	5,5	261	855	0,41	6,3	309	1013
10,2	158	FP	Rainier	37,5	1,476	N320	0,26	3,9	237	776	0,31	4,8	283	927
						N340	0,32	4,9	247	809	0,37	5,7	295	967
						N350	0,36	5,5	261	856	0,41	6,3	306	1004
						3N37	0,37	5,6	260	853	0,42	6,5	310	1015
10,4	160	LFN	Intercast	37,5	1,476	N340	0,33	5,1	297	974	0,38	5,8	338	1107
						3N37	0,35	5,3	277	909	0,40	6,2	324	1064
						N350	0,35	5,4	294	963	0,40	6,1	328	1077

.357 Magnum

Test barrel: 175 mm (7"), 1 in 18½" twist

Primers: Small Rifle

Cases: Remington, trim-to length 32.60 mm (1.283")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
7,1	110	HP/XTP	Hornady	40,0	1,575	N310	0,43	6,6	413	1 355	0,46	7,1	433	1 420
						N320	0,51	7,8	445	1 460	0,55	8,4	468	1 537
						N340	0,60	9,2	475	1 558	0,65	10,1	509	1 669
						3N37	0,68	10,5	496	1 627	0,75	11,6	527	1 728
						N350	0,69	10,6	497	1 631	0,74	11,4	525	1 722
8,0	124	LSWC	Intercast	41,0 ¹⁾	1,614	N110	1,20	18,5	523	1 716	1,38	21,2	626	2 055
						N340	0,56	8,6	443	1 453	0,61	9,4	469	1 540
						N350	0,59	9,1	446	1 463	0,65	10,0	472	1 547
						N110	1,11	17,1	510	1 673	1,21	18,7	553	1 813
8,1	125	FP/XTP	Hornady	40,0	1,575	N310	0,39	5,9	371	1 217	0,43	6,6	399	1 309
						N320	0,45	7,0	400	1 312	0,50	7,7	428	1 404
						N340	0,56	8,7	440	1 444	0,62	9,5	471	1 545
						N350	0,62	9,5	456	1 496	0,68	10,5	483	1 585
						N110	1,09	16,8	488	1 601	1,19	18,4	540	1 772

¹⁾ The cartridge overall length exceeds the CIP maximum.

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!
LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

.357 Magnum

Test barrel: 175 mm (7"), 1 in 18½" twist

Primers: Small Rifle

Cases: Remington, trim-to length 32.60 mm (1.283")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
9,1	140	HP	Speer	40,0	1,575	N340	0,53	8,2	404	1 325	0,57	8,9	429	1 407
						3N37	0,59	9,2	417	1 368	0,65	10,0	447	1 467
						N350	0,58	9,0	416	1 365	0,63	9,7	445	1 459
						N110	1,02	15,8	457	1 499	1,11	17,1	502	1 647
9,4	145	LSWC	Intercast	41.0 ¹⁾	1,614	N320	0,41	6,4	376	1 234	0,45	6,9	396	1 299
						N340	0,47	7,3	398	1 306	0,51	7,9	421	1 380
						3N37	0,54	8,4	412	1 352	0,60	9,2	440	1 443
						N350	0,51	7,9	404	1 325	0,58	9,0	436	1 429
10,2	158	HP	Speer	40,0	1,575	N110	0,98	15,1	479	1 572	1,06	16,4	511	1 677
						N320	0,40	6,2	335	1 099	0,44	6,7	361	1 183
						N340	0,47	7,3	361	1 184	0,51	7,8	384	1 259
						3N37	0,53	8,2	377	1 237	0,59	9,1	406	1 331
10,2	158	FP/XTP	Hornady	40,0	1,575	N350	0,54	8,3	385	1 263	0,59	9,1	406	1 333
						N105	0,76	11,8	427	1 401	0,82	12,6	454	1 490
						N110	0,98	15,1	451	1 480	1,05	16,3	488	1 602
						N340	0,45	6,9	376	1 234	0,49	7,6	394	1 291
10,2	158	HP	Speer	40,0	1,575	3N37	0,51	7,8	383	1 257	0,55	8,5	410	1 346
						N350	0,48	7,5	383	1 257	0,54	8,3	405	1 329
						N110	0,92	14,1	456	1 496	0,99	15,3	487	1 597
						N340	0,45	6,9	321	1 053	0,49	7,6	348	1 142
10,4	160	LFN	Intercast	40,0	1,575	3N37	0,50	7,7	336	1 102	0,55	8,5	366	1 201
						N350	0,47	7,3	325	1 066	0,53	8,2	360	1 182
						N105	0,65	10,1	379	1 243	0,73	11,3	409	1 342
						N110	0,82	12,7	382	1 253	0,91	14,0	425	1 394
11,7	180	TMJ	Speer	42.6 ¹⁾	1,677	N340	0,46	7,1	297	974	0,51	7,9	325	1 066
						3N37	0,46	7,1	297	974	0,51	7,9	325	1 066
						N350	0,45	6,9	288	945	0,50	7,7	324	1 063
						N105	0,60	9,2	337	1 106	0,66	10,2	366	1 199
13,0	200	TMJ	Speer	43.1 ¹⁾	1,697	N110	0,79	12,1	362	1 188	0,85	13,1	389	1 277

¹⁾ The cartridge overall length exceeds the CIP maximum.

.357 Remington Maximum

Test barrel: 300 mm (12"), 1 in 18½" twist

Primers: Small Rifle

Cases: Remington, trim-to length 40.60 mm (1.598")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
10,2	158	FP/XTP	Hornady	48,0	1,890	3N37	0,70	10,8	461	1 512	0,76	11,6	488	1 600
						N350	0,64	9,9	443	1 453	0,74	11,5	485	1 591
						N105	0,85	13,1	485	1 591	0,97	14,9	529	1 736
						N110	1,21	18,7	557	1 827	1,30	20,0	591	1 938
10,2	158	FP	Rainier	48,0	1,890	N350	0,71	11,0	440	1 444	0,81	12,5	490	1 608
						3N37	0,69	10,6	445	1 460	0,78	12,0	489	1 604
						N105	0,86	13,3	490	1 608	0,98	15,2	532	1 745
						N110	1,27	19,6	559	1 834	1,35	20,8	594	1 949

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!

LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

.357 Remington Maximum

Test barrel: 300 mm (12"), 1 in 18½" twist

Primers: Small Rifle

Cases: Remington, trim-to length 40.60 mm (1.598")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
10,4	160	LFN	Intercast	48,0	1,890	N37	0,66	10,1	465	1 526	0,75	11,6	491	1 611
						N350	0,66	10,1	459	1 506	0,72	11,0	482	1 580
						N105	0,87	13,4	517	1 696	0,99	15,3	555	1 820
11,7	180	Silhouette	Nosler	48,1	1,894	N105	0,79	12,2	443	1 453	0,88	13,6	482	1 580
						N110	1,07	16,6	500	1 640	1,15	17,8	530	1 740
						N120	1,40	21,7	516	1 693	1,50	23,1	549	1 801
						N110	0,99	15,3	440	1 444	1,07	16,5	471	1 545
13,0	200	TMJ	Speer	50.8 ¹⁾	2,000	N110	0,99	15,3	440	1 444	1,07	16,5	471	1 545
						N120	1,30	20,1	458	1 503	1,39	21,4	497	1 631

¹⁾ The cartridge overall length exceeds the CIP maximum.

.40 S.&W.

Test barrel: 140 mm (5½"), 1 in 16" twist

Primers: Small Pistol

Cases: Remington, trim-to length 21.40 mm (.843")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
8,7	135	HP	Nosler	28,6	1,126	N320	0,39	6,0	373	1 224	0,42	6,5	400	1 311
						N340	0,48	7,4	403	1 322	0,54	8,3	435	1 426
						3N37	0,54	8,3	403	1 322	0,59	9,1	437	1 434
10,0	155	HP-XTP	Hornady	28,6	1,126	N320	0,34	5,2	337	1 106	0,37	5,8	359	1 177
						N330	0,39	6,0	348	1 142	0,42	6,5	371	1 218
						N340	0,39	6,0	345	1 132	0,44	6,8	375	1 230
						3N37	0,47	7,3	357	1 171	0,52	8,0	386	1 267
						N350	0,43	6,6	351	1 152	0,49	7,5	379	1 245
10,0	155	FP	Rainier	28,6	1,126	N320	0,34	5,3	331	1 086	0,37	5,8	353	1 157
						N330	0,39	6,0	344	1 129	0,42	6,5	368	1 208
						N340	0,41	6,4	352	1 155	0,46	7,1	383	1 256
						N350	0,46	7,2	357	1 171	0,51	7,9	389	1 275
						3N37	0,49	7,5	359	1 178	0,54	8,3	388	1 274
10,7	165	TC-FMJ	PMC	28,6	1,126	N320	0,32	4,9	303	994	0,37	5,7	336	1 103
						N340	0,41	6,3	334	1 096	0,46	7,1	366	1 200
						3N37	0,47	7,3	343	1 125	0,51	7,9	374	1 226
						3N38	0,62	9,6	369	1 211	0,66	10,2	401	1 315
11,0	170	HP	Hornady	28,6	1,126	N340	0,34	5,3	313	1 027	0,39	6,0	341	1 117
						3N37	0,39	6,0	322	1 056	0,44	6,8	350	1 147
						N350	0,38	5,8	322	1 056	0,43	6,6	349	1 144
11,7	180	HP	Speer	28,6	1,126	N340	0,35	5,5	305	1 001	0,39	6,0	333	1 091
						3N37	0,38	5,8	303	994	0,43	6,6	334	1 095
						N350	0,38	5,9	319	1 047	0,43	6,6	343	1 126
13,0	200	TMJ	Speer	28,6	1,126	N340	0,30	4,7	267	876	0,34	5,3	293	961
						3N37	0,33	5,1	265	869	0,38	5,9	295	968
						N350	0,34	5,3	272	892	0,38	5,9	297	974
						3N38	0,45	6,9	304	997	0,50	7,7	335	1 099
						N105	0,49	7,5	321	1 053	0,51	7,9	341	1 118

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!

LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

10mm AUTO

Test barrel: 140 mm (5½"), 1 in 16" twist
 Primers: Large Pistol
 Cases: Remington, trim-to length 25.00 mm (.988")

Bullet					Powder	Starting load					Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity			Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]	
10,0	155	HP-XTP	Hornady	31,9	1,256	N340	0,43	6,7	355	1 165	0,47	7,3	380	1 246	
						3N37	0,47	7,2	359	1 178	0,53	8,2	387	1 270	
						N350	0,46	7,1	359	1 178	0,52	8,0	387	1 270	
10,0	155	FP	Rainiers	31,9	1,256	N340	0,47	7,2	369	1 211	0,50	7,8	392	1 285	
						N350	0,52	8,0	379	1 243	0,56	8,6	406	1 333	
						3N37	0,53	8,2	373	1 224	0,56	8,7	398	1 305	
11,7	180	HP	Speer	31,9	1,256	N340	0,39	6,0	312	1 024	0,42	6,5	339	1 111	
						3N37	0,43	6,6	333	1 093	0,48	7,4	355	1 165	
						N350	0,38	5,9	328	1 076	0,44	6,8	350	1 148	
						N105	0,60	9,3	372	1 220	0,65	10,1	396	1 299	
13,0	200	FMJ/FP	Hornady	31,9	1,256	N340	0,32	5,0	267	876	0,35	5,5	295	968	
						3N37	0,38	5,9	291	955	0,42	6,5	315	1 033	
						N350	0,34	5,3	284	932	0,39	6,0	307	1 008	
						N105	0,50	7,7	325	1 066	0,54	8,3	343	1 125	

.41 Remington Magnum

Test barrel: 150 mm (6"), 1 in 18¾" twist
 Primers: Large Pistol
 Cases: W-W Super, trim-to length 32,50 mm (1,280")

Bullet					Powder	Starting load					Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity			Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]	
11,0	170	JHC	Sierra	40,1	1,579	N350	0,72	11,1	415	1362	0,81	12,5	451	1480	
						N105	0,99	15,3	465	1526	1,10	16,9	500	1642	
						N110	1,41	21,8	500	1640	1,50	23,2	532	1746	
13,6	210	HP/XTP	Hornady	40,1	1,579	N350	0,67	10,3	373	1224	0,74	11,4	400	1312	
						N105	0,84	13,0	405	1329	0,95	14,6	437	1435	
						N110	1,20	18,5	436	1430	1,28	19,8	466	1529	

.44 S.&W. Special

Test barrel: 150 mm (6"), 1 in 18" twist
 Primers: Large Pistol
 Cases: Remington, trim-to length 29.30 mm (1.153")

Bullet					Powder	Starting load					Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity			Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]	
11,7	180	HP-XTP	Hornady	37,3	1,469	N320	0,44	6,8	285	935	0,49	7,5	315	1 033	
						N330	0,50	7,7	308	1 010	0,56	8,6	338	1 109	
						N340	0,57	8,8	319	1 047	0,62	9,5	349	1 145	
						N350	0,64	9,9	318	1 043	0,68	10,5	350	1 148	
13,0	200	HP-XTP	Hornady	37,3	1,469	N320	0,41	6,4	270	886	0,45	7,0	294	965	
						N330	0,50	7,7	287	942	0,55	8,5	315	1 033	
						N340	0,54	8,3	293	961	0,59	9,1	325	1 066	
						N350	0,59	9,1	296	971	0,64	9,9	329	1 079	

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!
 LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

.44 S.&W. Special

Test barrel: 150 mm (6"), 1 in 18" twist
 Primers: Large Pistol
 Cases: Remington, trim-to length 29.30 mm (1.153")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
14,3	220	FPJ-Match	Sierra	37,3	1,469	N320	0,34	5,2	221	725	0,39	5,9	255	837
						N330	0,40	6,2	232	761	0,46	7,0	271	889
						N340	0,43	6,6	248	814	0,48	7,4	278	912
						N350	0,50	7,7	254	833	0,56	8,6	289	948
15,6	240	JTC-Sil	Hornady	37,6	1,480	N320	0,31	4,9	193	633	0,36	5,6	223	732
						N330	0,35	5,5	206	676	0,40	6,2	234	768
						N340	0,41	6,3	222	728	0,46	7,1	252	827
						N350	0,49	7,5	239	784	0,53	8,2	271	889
16,2	250	FPJ	Sierra	37,3	1,469	N320	0,31	4,7	193	633	0,36	5,5	226	741
						N330	0,32	5,0	191	627	0,39	6,0	228	748
						N340	0,36	5,5	197	646	0,42	6,5	237	778
						N350	0,44	6,7	229	751	0,49	7,6	260	853
17,3	267	LFN	Intercast	39,1	1,539	N320	0,34	5,3	242	794	0,39	6,0	262	860
						N330	0,41	6,3	261	856	0,45	7,0	281	922
						N340	0,42	6,5	256	840	0,46	7,1	278	912
						N350	0,47	7,3	259	850	0,52	8,0	282	925

.44 Remington Magnum

Test barrel: 175 mm (7"), 1 in 20" twist
 Primers: Large Pistol
 Cases: Remington, trim-to length 32.40 mm (1.275")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
11,7	180	HP-XTP	Hornady	40,7	1,602	N320	0,69	10,7	407	1 335	0,77	11,8	437	1 432
						N340	0,84	12,9	439	1 440	0,92	14,1	472	1 549
						N350	0,89	13,8	448	1 470	0,99	15,3	481	1 578
						N105	1,23	19,0	498	1 634	1,40	21,6	543	1 781
						N110	1,63	25,1	492	1 614	1,76	27,1	534	1 751
13,0	200	HP-XTP	Hornady	40,7	1,602	N320	0,65	10,1	381	1 250	0,73	11,3	408	1 339
						N340	0,76	11,8	410	1 345	0,84	13,0	437	1 434
						3N37	0,89	13,7	433	1 421	0,98	15,2	462	1 515
						N350	0,83	12,8	416	1 365	0,95	14,6	453	1 487
						N105	1,09	16,8	459	1 506	1,26	19,4	500	1 642
14,3	220	FPJ-Match	Sierra	40,7	1,602	N110	1,58	24,4	494	1 621	1,71	26,3	530	1 740
						N320	0,59	9,0	350	1 148	0,67	10,4	375	1 232
						N340	0,72	11,2	381	1 250	0,80	12,3	405	1 328
						N350	0,83	12,8	402	1 319	0,96	14,8	439	1 441
						N105	1,08	16,7	432	1 417	1,22	18,8	470	1 542
15,6	240	JTC-Sil	Hornady	40,7	1,602	N320	0,58	9,0	331	1 086	0,63	9,7	354	1 161
						N340	0,67	10,4	358	1 175	0,75	11,5	380	1 247
						3N37	0,78	12,0	372	1 220	0,86	13,3	402	1 318
						N350	0,77	11,8	375	1 230	0,83	12,8	399	1 308
						N105	0,95	14,7	404	1 325	1,08	16,6	437	1 434
16,2	250	FPJ-Match	Sierra	40,7	1,602	N110	1,32	20,4	435	1 427	1,43	22,1	470	1 541
						N320	0,55	8,5	314	1 030	0,63	9,7	344	1 130
						N340	0,65	10,1	341	1 119	0,73	11,2	370	1 213
						N350	0,75	11,6	366	1 201	0,85	13,1	395	1 295
						N105	0,87	13,4	382	1 253	1,08	16,7	429	1 406

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!
 LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

.44 Remington Magnum

Test barrel: 175 mm (7"), 1 in 20" twist

Primers: Large Pistol

Cases: Remington, trim-to length 32.40 mm (1.275")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
17,3	267	LFN	Intercast	42,7 ¹⁾	1,681	N340	0,68	10,5	357	1 171	0,75	11,5	376	1 232
						3N37	0,77	11,8	365	1 198	0,85	13,2	391	1 284
						N350	0,74	11,4	360	1 181	0,82	12,7	385	1 262
						N110	1,32	20,3	422	1 385	1,41	21,8	450	1 476
19,4	300	HP-XTP	Hornady	43,6 ¹⁾	1,717	N340	0,62	9,5	304	997	0,68	10,5	323	1 061
						3N37	0,67	10,3	308	1 010	0,74	11,4	336	1 102
						N350	0,68	10,5	315	1 033	0,76	11,7	344	1 128
						N105	0,85	13,1	349	1 145	0,94	14,6	375	1 231
						N110	1,21	18,6	384	1 260	1,31	20,2	419	1 374
19,4	300	JSP	Sierra	43,6 ¹⁾	1,717	N340	0,61	9,3	296	971	0,66	10,2	319	1 046
						3N37	0,65	10,1	305	1 001	0,73	11,2	332	1 089
						N350	0,64	9,9	296	971	0,72	11,1	326	1 071
						N105	0,82	12,6	342	1 122	0,90	13,8	368	1 208
						N110	1,15	17,8	369	1 211	1,23	19,1	398	1 305

¹⁾ The cartridge overall length exceeds the CIP maximum.

.45 AUTO

Test barrel: 150 mm (6"), 1 in 16" twist

Primers: Large Pistol

Cases: Remington, trim-to length 22.70 mm (.893")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
10,0	154	LSWC	Intercast	31,5	1,240	N320	0,38	5,9	315	1033	0,41	6,4	341	1117
						N340	0,49	7,6	344	1129	0,53	8,2	369	1211
11,7	180	LSWC	Intercast	31,6	1,244	N320	0,35	5,4	296	971	0,39	6,0	321	1053
						N340	0,44	6,8	311	1020	0,48	7,4	337	1104
12,0	185	TMJ-SWC	Speer	31,5	1,240	N310	0,27	4,2	258	846	0,30	4,6	277	909
						N320	0,36	5,6	278	913	0,39	6,1	301	988
						N340	0,46	7,1	303	993	0,50	7,7	330	1082
12,0	185	FN	Rainier	30,5	1,201	N320	0,37	5,8	291	955	0,41	6,3	316	1037
						N340	0,47	7,3	303	994	0,51	7,9	333	1093
						N350	0,57	8,8	325	1065	0,61	9,4	357	1170
13,0	200	LSWC	Intercast	31,5	1,240	N310	0,24	3,7	252	827	0,26	4,0	272	892
						N320	0,30	4,7	271	888	0,33	5,1	292	958
						N340	0,39	6,1	295	966	0,43	6,6	317	1039
13,0	200	FMJ-CT	Hornady	31,5	1,240	N320	0,32	5,0	261	855	0,35	5,4	283	928
						N340	0,40	6,2	276	906	0,44	6,8	300	986
						N350	0,43	6,7	279	916	0,47	7,3	303	996
14,9	230	FMJ-RN	Hornady	32,0	1,260	N310	0,24	3,7	219	719	0,27	4,2	235	771
						N320	0,32	4,9	239	784	0,34	5,2	259	850
						N340	0,38	5,9	253	830	0,41	6,4	278	912
						N350	0,43	6,7	257	845	0,47	7,2	280	920

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!

LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

.45 Colt

Test barrel: 150 mm (6"), 1 in 16" twist

Primers: Large Pistol

Cases: Remington, trim-to length 32.50 mm (1.279")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
11,7	180	LSWC	Intercast	40,5	1,594	N320	0,55	8,6	341	1 119	0,60	9,2	367	1 204
						N330	0,66	10,1	362	1 188	0,71	10,9	389	1 276
						N340	0,69	10,7	362	1 188	0,74	11,5	391	1 283
						N350	0,75	11,6	363	1 191	0,83	12,8	399	1 309
12,0	185	HP/XTP	Hornady	40,5	1,594	N320	0,57	8,7	334	1 096	0,62	9,6	360	1 181
						N340	0,71	10,9	342	1 122	0,76	11,8	377	1 237
						N350	0,80	12,3	346	1 135	0,86	13,2	382	1 253
12,0	185	FN	Rainier	40,5	1,594	N320	0,57	8,9	328	1 076	0,62	9,6	358	1 175
						N330	0,67	10,4	333	1 093	0,73	11,2	367	1 204
						N340	0,72	11,1	343	1 125	0,78	12,1	383	1 257
						N350	0,80	12,3	346	1 135	0,88	13,6	389	1 276
13,0	200	FMJ-CT	Hornady	40,5	1,594	N320	0,52	8,1	317	1 040	0,58	8,9	342	1 122
13,0	200	LSWC	Hornady	40,5	1,594	N320	0,56	8,7	326	1 070	0,61	9,4	347	1 138
						N340	0,70	10,9	341	1 119	0,75	11,6	364	1 194
14,9	230	FMJ-Match	Sierra	40,5	1,594	N320	0,49	7,5	286	938	0,54	8,3	306	1 004
						N340	0,63	9,7	301	988	0,68	10,4	330	1 083
16,2	250	HP-XTP	Hornady	40,5	1,594	N320	0,47	7,3	257	843	0,51	7,8	280	919
						N340	0,60	9,2	281	922	0,64	9,8	307	1 007
						N350	0,69	10,7	297	974	0,72	11,2	321	1 053
						N105	0,91	14,1	296	971	0,97	15,0	344	1 129

.45 Winchester Magnum

Test barrel: 300 mm (12"), 1 in 16" twist

Primers: Large Pistol

Cases: Winchester, trim-to length 30.30 mm (1.192")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
12,0	185	HP/XTP	Hornady	38,5	1,516	N350	0,90	13,9	481	1 578	1,04	16,1	529	1 735
						3N37	0,97	15,0	520	1 706	1,06	16,4	541	1 776
						N105	1,23	18,9	549	1 801	1,39	21,4	591	1 938
13,0	200	TMJ-SWC	Speer	38,5	1,516	3N37	0,95	14,6	500	1 640	1,02	15,7	520	1 707
						N110	1,56	24,1	551	1 808	1,68	25,9	588	1 929
13,0	200	FMJ-CT	Hornady	39,5	1,555	N105	1,15	17,7	507	1 663	1,28	19,7	546	1 790
14,9	230	FMJ-RN	Hornady	39,5	1,555	3N37	0,87	13,4	430	1 411	0,95	14,6	462	1 516
						N110	1,48	22,8	513	1 683	1,59	24,5	542	1 778
16,2	250	HP-XTP	Hornady	38,2	1,504	N350	0,71	10,9	341	1 119	0,81	12,5	391	1 284
						3N37	0,79	12,2	377	1 237	0,85	13,2	414	1 358
						N105	0,96	14,9	412	1 352	1,06	16,4	442	1 450
						N110	1,28	19,8	461	1 512	1,41	21,8	492	1 613

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!

LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

.454 Casull

Test barrel: 240 mm (9½"), 1 in 24" twist

Primers: Small Rifle

Cases: Freedom Arms, trim-to length 33,30 mm (1,311")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
12,0	185	HP/XTP	Hornady	41,7	1,642	3N37	1,14	17,6	531	1742	1,36	21,0	588	1929
						N350	1,18	18,2	537	1762	1,39	21,4	593	1946
						N105	1,72	26,5	606	1988	1,90	29,3	653	2142
14,6	225	HP	Speer	42,7	1,681	3N37	1,09	16,8	474	1555	1,27	19,6	523	1716
						N105	1,59	24,5	536	1759	1,73	26,7	580	1903
						N110	2,00	30,9	566	1857	2,17	33,5	614	2014
16,2	250	HP/XTP	Hornady	42,8	1,685	3N37	1,01	15,6	437	1434	1,18	18,2	487	1598
						N105	1,39	21,4	481	1578	1,57	24,2	536	1759
						N110	1,82	28,1	523	1716	1,99	30,7	569	1867
19,4	300	Plated HP	Speer	44,5	1,752	3N37	0,99	15,3	396	1299	1,10	17,0	433	1421
						N105	1,28	19,8	431	1414	1,49	23,0	484	1588
						N110	1,71	26,4	474	1555	1,86	28,7	514	1686

.50 AE

Test barrel: 150 mm (6"), 1 in 19" twist

Primers: Large Pistol

Cases: Speer, trim-to length 32,50 mm (1,280")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
19,4	300	JHP	IMI	40,0	1,575	N105	1,26	19,4	395	1296	1,38	21,3	436	1430
						N110	1,64	25,3	396	1299	1,86	28,7	456	1496
						N120	2,11	32,6	363	1191	2,33	36,0	417	1368
21,1	325	UCHP	Speer	40,0	1,575	N105	1,15	17,7	357	1171	1,26	19,4	406	1332
						N110	1,56	24,1	386	1266	1,75	27,0	437	1434
						N120	1,99	30,7	348	1142	2,23	34,4	408	1339

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!

LOADS LESS THAN MINIMUM CHARGES SHOWN ARE NOT RECOMMENDED

Vihtavuori Smokeless Loads for Cowboy Action Shooting

About the Data

These loads are developed to give the velocities required for the cowboy action shooting using revolvers with lead bullets. The maximum load is determined by the velocity limit about 300 m/s, or by the maximum pressure limit according to the CIP October 1, 1992 rules. The bold text in the tables indicate the maximum load according to CIP pressure level. **The maximum loads must never be exceeded.**

All the listed loads are intended to be used in modern firearms, which are according to the SAAMI requirements. Please use a competent gunsmith to evaluate that the condition of your gun is adequate to be used with the pressures indicated in the tables. The starting loads are the lowest charges which appeared to give clean burning, i.e. no unburned residues in the barrel or in the case, in our test shooting. This limit may, however vary according to the revolver used.

There are some special features, which must be considered, when using reduced loads like the ones presented in the tables bellow. The same facts are equally valid always when using any smokeless powder in such loads.

1) Double charges

Some of these loads are so small that throwing the load twice in the same case is possible because of the large case volume. Doubling the charge accidentally causes most probably truly lethal chamber pressures. Therefore, **it is a must for everyone using this data to check visually every single load for the double charge before seating the bullet.**

2) Free space in the case

When using charges which leave large amount of free space in the case, the shooting characteristics may vary largely depending on where the powder is located in the case. If the powder lies totally in the bottom of the case (i.e. in the end where primer is), the muzzle velocity and especially the maximum pressure become much higher. The maximum pressure may even be doubled when same powder charge is moved from the bullet end to the primer end of the case.

This can simply be demonstrated by shaking the revolver barrel upwards or barrel downwards just before turning it smoothly in horizontal position, aiming and shooting. Also the recoil may transfer the powder in either end of the case. This is sometimes seen as a velocity change between the first shot and the following shots.

The shot to shot deviations in velocity and pressure are normally increased when using load which leaves the cases half empty. For this reason such loads are not recommended for target loads. The data below is tested in a way that the powder is as much as possible in the primer side before firing, and therefore, the pressures and the velocities represent the maximum values which were obtained using our test equipment and cartridge components indicated in the table.

3) Risk for underload detonation

This risk is always present when using highly reduced loads of any smokeless powder. The large free space in the case may generate a pressure wave which can cause, in the worst case, powder to burn as a shock wave, i.e. to detonate, instead of normal fast burning process. The extremely sharp pressure peaks involved in detonation can destroy the weapon and may lead to serious injury.

All these loads given here are extensively pressure tested and no signs of underload detonation were found. We strongly recommend everyone to follow strictly these tables to minimize the risk for underload detonation.

Warnings

Smokeless powder differs considerably in its burning characteristics from common "black powder". Black powder burns essentially at the same rate in the open (unconfined) as when in a gun. The burning rate of smokeless powder increases with increasing pressure. If burning smokeless powder is confined, gas pressure will rise and eventually can cause the container or chamber to burst. A slight increase in smokeless powder charge after maximum load causes sharp increase in maximum pressure in the chamber. **Never exceed the maximum loads.**

.38 Special

Test barrel: 125 mm (5"), 1 in 18" twist

Primers: Small Pistol

Cases: Remington, trim-to length 29,10 mm (1,146")

Bullet				Powder		Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
10,3	158	LSWC/HP		36,5	1,437	N320	0,21	3,3	230	755	0,25	3,8	256	840
						N330	0,23	3,6	240	787	0,27	4,1	269	883

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.357 Magnum

Test barrel: 150 mm (6"), 1 in 18½" twist
Primers: Small Rifle
Cases: Remington, trim-to length 32,60 mm (1,283")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
10,3	158	LSWC/HP		40,0	1,575	N330	0,25	3,9	241	791	0,32	5,0	304	997
						N340	0,29	4,5	245	804	0,38	5,9	320	1050

.44 S.&W. Special

Test barrel: 165 mm (6½"), 1 in 18" twist
Primers: Large Pistol
Cases: Remington, trim-to length 29,30 mm (1,153")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
15,6	240	SWC/HP		39,1	1,539	N320	0,30	4,7	214	702	0,38	5,9	260	853
						N330	0,36	5,5	229	751	0,41	6,3	270	886
17,3	267	LFN		39,1	1,539	N320	0,25	3,8	193	633	0,34	5,3	242	794
						N330	0,32	4,9	216	709	0,38	5,9	254	833
						N340	0,43	6,6	261	856	0,47	7,3	282	925

.44 Remington Magnum

Test barrel: 175 mm (7"), 1 in 20" twist
Primers: Large Pistol
Cases: Remington, trim-to length 32,40 mm (1,276")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
17,3	267	LFN		40,0	1,575	N340	0,38	5,9	224	735	0,49	7,5	288	745

.45 Colt

Test barrel: 150 mm (6"), 1 in 16" twist
Primers: Large Pistol
Cases: Remington, trim-to length 32,50 mm (1,280")

Bullet					Powder	Starting load				Maximum load				
Weight		Type	Mfg.	C.O.L.		Type	Weight		Velocity		Weight		Velocity	
[g]	[grs]			[mm]	[in.]		[g]	[grs]	[m/s]	[fps]	[g]	[grs]	[m/s]	[fps]
13,0	200	RN		40,5	1,594	N320	0,44	6,8	259	850	0,56	8,7	318	1043
						N330	0,52	8,0	267	876	0,56	8,6	298	978
16,2	250	RN		40,5	1,594	N320	0,36	5,6	229	751	0,45	6,9	279	915
						N330	0,41	6,3	238	781	0,49	7,5	293	961

For more Vihtavuori CAS loads please check for www.longhunt.com

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Notes

Dear Customer,

The **Vihtavuori Powders** and these booklets are available worldwide thorough our distributors listed below. Most of these Vihtavuori distiributos carry also full line of Lapua reloading components. Please check the availability.

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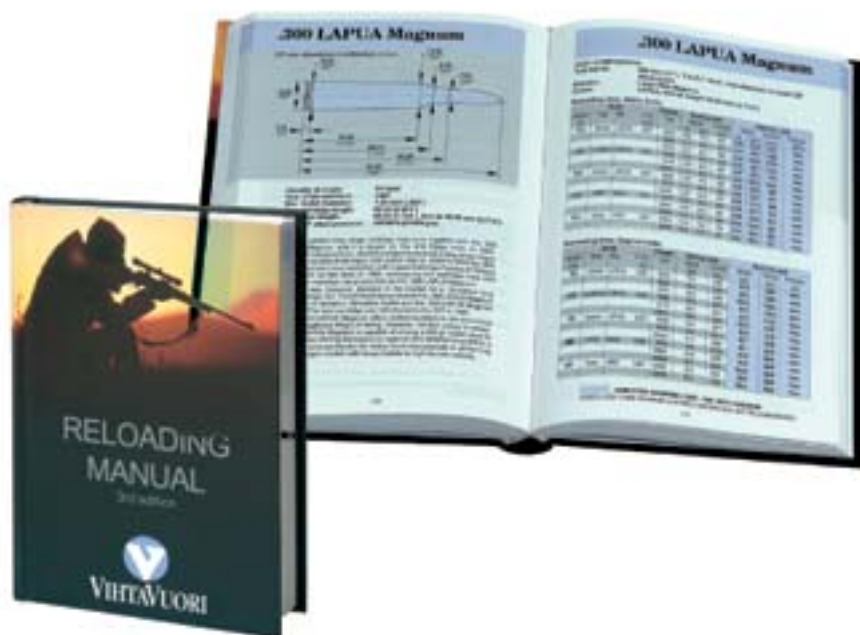
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The Vihtavuori Reloading Manual (3rd edition) contains comprehensive information about internal and external ballistics, as well as interesting articles on various precision shooting disciplines. The manual is available from Vihtavuori/Lapua distributors.



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