METRIC
RELOADING GUIDE
for Centerfire Cartridges

2/2002

VIHTAVUORI

Burning Rate Chart

This table indicates the *approximate* order of the burning rate of the commonly available powders. The table is only approximate and *not* to be used for developing loads.

	Vihtavuori	Norma	RWS	SNPE	PRB	IMR	Alliant	Hodgdon	Accurate	W-W
Fast Burning					PCL514			Clays		
		R1						Clays Int.		
	N310		P805	Ba10	PCL504			HP38		
			P801		PCL505		Bullseye		Solo 1000	
					PCL505					231
	N320				PCL506	700X	Red Dot	Trap100	No. 2	452
						PB	Green Dot			
						SR7625				
			P804							473
			P803				Unique	Clays Universal	No. 5	
	N330			Ba9	PCL501			HS-6		540
	N340					SR4756	Herco			
	3N37									
	N350									
	3N38						Blue Dot			571
	N105							HS-7	No.7	
							Hercules 2400			
		R-123							No. 9	
			P806	S10		SR4759		H110		
	N110		R910	Tubal1	PCL512	IMR4227		H4198		296
										680
		200	R901					H4227	MP 5744	
	N120					IMR4198	Reloader 7		1680	
				Tubal2					2015	
			R902	Tubal3	PCL508	IMR3031	Reloader 11			
	N130	201			PCL507			H322	2230	
	N133	202						BL-(C)2	2460	748
								H335		
			R903							
						IMR4064			2520	
						IMR4895	Reloader 12	H4895		
	N135			Tubal4						
						IMR4320		Varget		
	N140		R907	Tubal5	PCL511		Reloader15	H380	2700	
	N540			Tubal6				H414		760
	N150		R904					H4350	4350	
	N550			Tubal7		IMR4350	Reloader 19			
		204						H450		
Slow Burning	N160					IMR4831				785
	N560		R905	Tubal8				H4831	3100	
	N165	MRP					Reloader 22	H1000		
						IMR7828		H870	8700	
	N170									

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Preface

The new Vihtavuori Metric Reloading Guide 2/2002 for Centerfire Ammunition is an updated version of the previous Vihtavuori Reloading Guide 1/2002. The contents of this new issue 2/2002 has been revised with new loading data for:

- legendary LAPUA D166 FMJBT bullet in cal. 7,62 x 53R
- cal. 7,5 x 55 Swiss GP31
- cal. .300 Remington Ultra Magnum
- cal. .38 Super Lapua, Lapua's implementation of .38 Super Auto.

All the loads in this guide are pressured 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 is carried out by Nammo Lapua Oy. The list of the prwder distributors can be found at **www.vihtavuori.fi/ Distributors.html** The distributor information as well as the contact information for customer service is given in the back of this guide.

We wish you successful reloading with Vihtavuori powders.

VIHTAVUORI

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 propellant and the slowest canister reloading powder generally available from any manufacturer.

N500 series

Adding nitroglyceriol 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
* nitroglycerol
* coating agent
* stabilizer
* flame reducing agent
* 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 three burning rates:

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 the five N300 series propellants and two 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 disclaim 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 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 bum 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 bum 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 bums.

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 t o 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 form 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 Nexplo Vihtavuori Oy and Nammo Lapua Oy. The data given here were obtained in laboratory conditions following strictly the CIP (Commission International Permanente) June 13, 1990, November 9, 1993 and August 6, 1998 rules. The listed maximum loads have been determined according to the respective CIP/SAAMI maximum pressure specifications, 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. The loads published here do not exceed the maximum pressure introduced by the CIP. DO NOT ATTEMPT ANY EXTRAPOLATIONS. PLEASE FOLLOW THE DATA AS WRITTEN.

Before starting the reloading process see the Reloading Safety Rules. Because Nammo Lapua Oy has no control over either handling or storage of the reloading components as well as over the entire reloading process, Nammo Lapua Oy cannot accept any liability for the possible effects of the use of Lapua and/or Vihtavuori reloading components.

The load development is done according to the methods described in Vihtavuori Reloading Manual. For that as well as further reloading information see Vihtavuori Reloading Manual.

7mm TCU

Test barrel: 360 mm, 1 in 10" twist
Primers: Small Rifle
Cases: Fireformed LAPUA .223 Remington, trim-to length 44.50 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
6.5	**100**	HP	Hornady	62.5	N120	1.48	22.8	667	**1.64**	**25.3**	**744**
					N130	1.62	25.0	672	**1.79**	**27.6**	**753**
					N133	1.77	27.3	695	**1.96**	**30.2**	**774**
7.8	**120**	SSSP	Hornady	63.5	N120	1.32	20.4	606	**1.45**	**22.4**	**655**
					N130	1.45	22.4	610	**1.61**	**24.8**	**673**
					N133	1.62	25.0	630	**1.81**	**27.9**	**701**
8.4	**130**	Spitzer	Speer	65.0	N120	1.24	19.1	542	**1.38**	**21.3**	**596**
					N130	1.40	21.6	573	**1.55**	**23.9**	**626**
					N133	1.46	22.5	576	**1.62**	**25.0**	**633**
9.7	**150**	SBT	Sierra	65.0	N120	1.17	18.1	513	**1.30**	**20.1**	**562**
					N130	1.31	20.2	535	**1.45**	**22.4**	**586**
					N133	1.38	21.3	542	**1.53**	**23.6**	**599**
					N135	1.44	22.2	538	**1.60**	**24.7**	**597**
10.4	**160**	SBT	Sierra	66.0	N120	1.12	17.3	480	**1.25**	**19.3**	**531**
					N130	1.26	19.4	505	**1.41**	**21.8**	**558**
					N133	1.31	20.2	511	**1.45**	**22.4**	**559**
					N135	1.45	22.4	531	**1.61**	**24.8**	**582**
					N540	1.48	22.8	544	**1.63**	**25.2**	**598**

NOTE: This cartridge is not supported by CIP or SAAMI. The maximum loads does 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, 1 in 10" twist
Primers: Small Rifle
Cases: Remington, trim-to length 38.40 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
6.5	**100**	HP	Hornady	56.0	N120	1.74	26.9	737	**1.93**	**29.8**	**829**
					N130	1.89	30.6	746	**2.10**	**32.4**	**838**
7.8	**120**	SSSP	Hornady	56.6	N120	1.61	24.8	662	**1.80**	**27.8**	**738**
					N130	1.74	26.9	668	**1.94**	**29.9**	**784**
					N133	1.90	29.3	700	**2.11**	**32.6**	**771**
9.1	**140**	Ballistic Tip	Nosler	60.3	N120	1.43	22.1	588	**1.58**	**24.4**	**640**
					N130	1.58	24.4	595	**1.73**	**26.7**	**661**
					N133	1.66	25.6	607	**1.84**	**28.4**	**671**
9.7	**150**	Ballistic Tip	Nosler	60.3	N120	1.40	21.6	569	**1.54**	**23.8**	**619**
					N130	1.51	23.3	577	**1.67**	**25.8**	**635**
					N133	1.60	24.7	587	**1.77**	**27.3**	**642**
					N135	1.69	26.1	584	**1.87**	**28.9**	**650**
10.4	**160**	HPBT	Sierra	59.7	N120	1.29	19.9	536	**1.42**	**21.9**	**580**
					N130	1.40	21.6	552	**1.55**	**23.9**	**602**
					N133	1.52	23.5	560	**1.69**	**26.1**	**619**
					N135	1.61	24.8	567	**1.79**	**27.6**	**630**

7 x 49 GJW

Test barrel: 380 mm, 1 in 9" twist
Primers: Small Rifle
Cases: MFT, trim-to length 48.75 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
9.7	**150**	Ballistic Tip	Nosler	73.5	N130	1.52	23.4	592	**1.67**	**25.7**	**642**
					N133	1.59	24.6	591	**1.74**	**26.9**	**644**
					N135	1.72	26.6	608	**1.86**	**28.7**	**658**
10.9	**168**	HPBT	Sierra	73.5	N130	1.47	22.8	562	**1.63**	**25.1**	**611**
					N133	1.56	24.1	565	**1.71**	**26.5**	**617**
					N135	1.70	26.3	585	**1.83**	**28.2**	**631**
					N140	1.77	27.3	585	**1.91**	**29.5**	**636**

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

.30 Luger

Test barrel: 200 mm, 1 in 11" twist
Primers: Small Pistol
Cases: LAPUA, trim-to length 21.40 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
6.0	**93**	FMJ	Sako	29.7	N340				**0.35**	**5.4**	**390**

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

Test barrel: 175 mm, 1 in 18½" twist
Primers: Small Pistol
Cases: Remington, trim-to length 23.20 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
5.4	**83**	LWC	LAPUA	24.6	N310	0.09	1.4	231	**0.11**	**1.7**	**258**
6.4	**98**	LWC	LAPUA	24.6	N310	0.07	1.1	186	**0.08**	**1.2**	**208**
6.4	**98**	LRN	LAPUA	32.3	N310	0.12	1.9	256	**0.14**	**2.2**	**277**

.32 S.&W. Long Wadcutter

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

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
5.35	**83**	LWC	LAPUA	24.6	N310	0.11	1.7	230	**0.13**	**2.0**	**280**
6.35	**98**	LWC	LAPUA	24.6	N310	0.10	1.5	230	**0.12**	**1.8**	**260**

NOTE: THE LOADS LISTED ABOVE ARE SAFE ONLY IN MODERN TARGET PISTOLS AND REVOLVERS, IF USED TOGETHER WITH LAPUA HEADSTAMPED BRASS!

.380 ACP

Test barrel: 90 mm, 1 in 10" twist
Primers: Small Pistol
Cases: Sako, trim-to length 17.20 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
5.8	**90**	HP-XTP	Hornady	24.9	N310				**0.18**	**2.8**	**308**
					N320				**0.23**	**3.5**	**327**
6.2	**95**	TMJ	Speer	24.9	N310				**0.18**	**2.8**	**303**
					N320				**0.23**	**3.6**	**325**
6.5	**100**	FMJ	Hornady	24.9	N310				**0.16**	**2.5**	**278**
					N320				**0.21**	**3.3**	**307**

NOTE!
WHEN ONLY THE MAXIMUM LOADS ARE SHOWN IN THE TABLES ABOVE START LOADING WITH APPROXIMATELY 15 % SMALLER POWDER CHARGE.

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

9mm Luger

Test barrel: 100 mm, 1 in 10" twist
Primers: Small Pistol
Cases: Remington, trim-to length 19.00 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
5.8	**90**	HP-XTP	Hornady	27.0	N310	0.26	4.0	373	**0.28**	**4.3**	**388**
					N320	0.32	4.9	406	**0.35**	**5.4**	**426**
					N330	0.37	5.6	425	**0.40**	**6.2**	**443**
					N340	0.37	5.7	430	**0.41**	**6.4**	**460**
					N350	0.43	6.6	432	**0.48**	**7.4**	**464**
					3N37	0.43	6.6	443	**0.48**	**7.4**	**467**
6.5	**100**	HP	Speer	27.5	N320	0.31	4.8	379	**0.34**	**5.3**	**405**
					N330	0.36	5.5	399	**0.39**	**6.0**	**422**
					N340	0.38	5.9	402	**0.43**	**6.6**	**438**
					3N37	0.43	6.7	407	**0.49**	**7.5**	**443**
7.5	**115**	HP-XTP	Hornady	29.0	N320	0.27	4.1	346	**0.30**	**4.6**	**368**
					N330	0.32	5.0	362	**0.36**	**5.5**	**388**
					N340	0.35	5.5	373	**0.39**	**6.1**	**404**
					3N37	0.40	6.2	377	**0.45**	**6.9**	**405**
					N350	0.39	6.0	379	**0.43**	**6.6**	**402**
7.5	**115**	RN	Rainier	29.0	N320	0.26	4.1	331	**0.29**	**4.5**	**353**
					N330	0.31	4.7	347	**0.33**	**5.2**	**366**
					N340	0.33	5.1	358	**0.36**	**5.6**	**380**
					N350	0.38	5.8	371	**0.42**	**6.5**	**397**
					3N37	0.40	6.2	369	**0.43**	**6.6**	**387**
7.8	**120**	CEPP	LAPUA	28.7	N320	0.26	4.0	314	**0.28**	**4.4**	**336**
					N330	0.31	4.8	345	**0.34**	**5.3**	**368**
					N340	0.33	5.1	352	**0.37**	**5.7**	**376**
					N350	0.39	6.0	364	**0.42**	**6.5**	**389**
					3N37	0.37	5.7	345	**0.40**	**6.2**	**368**
8.0	**124**	LSWC	Intercast	29.0	N320	0.25	3.8	331	**0.27**	**4.2**	**347**
					N330	0.29	4.5	348	**0.31**	**4.9**	**362**
					N340	0.31	4.8	352	**0.34**	**5.3**	**375**
					3N37	0.36	5.5	357	**0.39**	**6.0**	**376**
					N350	0.33	5.1	350	**0.36**	**5.6**	**367**
8.0	**124**	FMJ/FP	Hornady	29.0	N320	0.26	4.0	316	**0.28**	**4.4**	**340**
					N330	0.32	5.0	343	**0.34**	**5.3**	**365**
					N340	0.35	5.3	353	**0.37**	**5.8**	**376**
					3N37	0.40	6.1	362	**0.43**	**6.6**	**382**
					N350	0.36	5.6	354	**0.40**	**6.1**	**376**
					3N38	0.42	6.5	337	**0.49**	**7.6**	**377**
8.0	**124**	RN	Rainier	29.0	N320	0.25	3.8	310	**0.27**	**4.2**	**331**
					N330	0.28	4.4	329	**0.31**	**4.8**	**349**
					N340	0.31	4.7	334	**0.34**	**5.3**	**357**
					N350	0.35	5.5	346	**0.39**	**6.1**	**371**
					3N37	0.36	5.5	351	**0.40**	**6.1**	**370**

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

9mm Luger

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
8.4	**130**	FMJ	Sierra	29.0	N320	0.24	3.7	304	**0.26**	**4.1**	**324**
					N330	0.27	4.2	319	**0.30**	**4.6**	**338**
					N340	0.29	4.4	329	**0.31**	**4.9**	**345**
					N350	0.34	5.2	334	**0.36**	**5.6**	**350**
					3N37	0.33	5.1	330	**0.37**	**5.7**	**349**
					3N38	0.39	6.0	310	**0.44**	**6.8**	**355**
					N105	0.46	7.2	357	**0.48**	**7.5**	**382**
9.4	**145**	LRN	Intercast	29.0	N330	0.23	3.5	290	**0.25**	**3.9**	**310**
					N340	0.26	4.0	304	**0.28**	**4.4**	**323**
					N350	0.28	4.3	302	**0.31**	**4.8**	**325**
					3N37	0.30	4.6	305	**0.33**	**5.1**	**327**
9.5	**147**	HP/XTP	Hornady	29.0	N330	0.26	4.1	299	**0.28**	**4.4**	**320**
					N340	0.26	4.1	294	**0.28**	**4.4**	**314**
					3N37	0.31	4.8	304	**0.34**	**5.3**	**326**
					N350	0.30	4.7	308	**0.33**	**5.1**	**332**
					3N38	0.36	5.5	303	**0.40**	**6.2**	**334**
					N105	0.40	6.2	322	**0.42**	**6.5**	**343**
9.5	**147**	RN	Rainier	29.0	N330	0.23	3.6	276	**0.25**	**3.9**	**291**
					N340	0.25	3.9	277	**0.27**	**4.2**	**298**
					N350	0.28	4.3	291	**0.31**	**4.8**	**315**
					3N37	0.30	4.6	291	**0.32**	**5.0**	**313**
9.7	**150**	CEPP	Lapua	28.7	N330	0.23	3.5	269	**0.25**	**3.8**	**288**
					N340	0.25	3.9	280	**0.27**	**4.2**	**299**
					N350	0.28	4.4	290	**0.30**	**4.7**	**308**
					3N37	0.28	4.4	281	**0.31**	**4.8**	**303**

9 x 21

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

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
6.5	**100**	HP	Speer	29.0	N340	0.39	6.0	419	**0.43**	**6.6**	**447**
					3N37	0.44	6.8	430	**0.49**	**7.5**	**456**
					N350	0.46	7.0	436	**0.50**	**7.7**	**462**
7.5	**115**	FMJ	Sierra	29.5	N340	0.35	5.4	383	**0.38**	**5.9**	**403**
					3N37	0.39	6.0	378	**0.43**	**6.6**	**405**
					N350	0.39	6.1	391	**0.43**	**6.6**	**413**
					N105	0.53	8.2	413	**0.57**	**8.8**	**441**

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

9 x 21

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
8.0	**123**	FMJ	LAPUA	29.5	N340	0.31	4.8	350	**0.34**	**5.3**	**366**
					3N37	0.35	5.4	356	**0.39**	**6.0**	**375**
					N350	0.35	5.5	351	**0.38**	**5.9**	**372**
					N105	0.45	6.9	375	**0.48**	**7.5**	**400**
9.5	**147**	HP-XTP	Hornady	29.5	3N37	0.32	4.9	312	**0.35**	**5.3**	**331**
					N350	0.30	4.6	326	**0.33**	**5.0**	**340**
					N105	0.38	5.9	329	**0.41**	**6.4**	**350**

.357 SIG

Test barrel: 130 mm, 1 in 16" twist
Primers: Small Pistol
Cases: Starline, trim-to length 21.85 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
6.2	**95**	FMJ	Speer	28.5	N340	0.53	8.1	482	**0.60**	**9.2**	**482**
					3N37	0.59	9.2	491	**0.67**	**10.3**	**534**
					N350	0.60	9.3	492	**0.68**	**10.5**	**539**
7.5	**115**	FMJ	Sierra	28.5	N340	0.44	6.9	423	**0.52**	**8.0**	**466**
					3N37	0.51	7.8	434	**0.58**	**8.9**	**474**
					N350	0.50	7.7	431	**0.58**	**9.0**	**478**
8.0	**123**	FMJ	LAPUA	28.5	N340	0.42	6.5	398	**0.50**	**7.6**	**441**
					3N37	0.49	7.5	409	**0.56**	**8.6**	**451**
					N350	0.49	7.5	404	**0.56**	**8.7**	**454**
8.0	**123**	Megashock	LAPUA	28.5	N340	0.42	6.5	398	**0.50**	**7.7**	**423**
					3N37	0.48	7.5	411	**0.56**	**8.6**	**453**
					N350	0.48	7.4	409	**0.57**	**8.8**	**449**
8.4	**130**	RN B	Rainier	28.5	N340	0.42	6.5	385	**0.48**	**7.4**	**423**
					3N37	0.48	7.5	391	**0.54**	**8.4**	**414**
					N350	0.47	7.3	400	**0.55**	**8.5**	**443**

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

.38 Super Auto

Test barrel: 140 mm, 1 in 16" twist
Primers: Small Pistol
Cases: Remington +P, trim-to length 22.70 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
7.5	**115**	HP-XTP	Hornady	31.5	N320	0.33	5.1	362	**0.38**	**5.9**	**402**
					N340	0.39	6.0	381	**0.45**	**6.9**	**426**
					3N37	0.42	6.5	385	**0.51**	**7.9**	**436**
					N350	0.36	5.5	357	**0.46**	**7.1**	**415**
7.5	**115**	FMJ	Sierra	32.4	N350	0.51	7.9	414	**0.59**	**9.1**	**463**
					3N37	0.48	7.5	395	**0.54**	**8.4**	**443**
7.5	**115**	RN	Rainier	31.5	N320	0.31	4.8	357	**0.37**	**5.7**	**394**
					N340	0.39	6.0	382	**0.45**	**7.0**	**426**
					N350	0.43	6.6	388	**0.52**	**7.9**	**438**
					3N37	0.44	6.9	390	**0.51**	**7.9**	**432**
8.0	**124**	FMJ-FP	Hornady	32.0	N340	0.39	6.0	368	**0.46**	**7.1**	**413**
					3N37	0.46	7.1	374	**0.50**	**7.7**	**401**
					N350	0.41	6.4	366	**0.49**	**7.5**	**411**
					3N38	0.52	8.0	388	**0.60**	**9.3**	**446**
					N105	0.64	10.0	429	**0.71**	**10.9**	**486**
8.0	**124**	LSWC	Intercast	32.0	N340	0.35	5.4	367	**0.41**	**6.4**	**405**
					N350	0.39	6.0	371	**0.46**	**7.1**	**415**
					3N37	0.41	6.3	377	**0.48**	**7.4**	**417**
8.4	**130**	FMJ	Sierra	32.0	N340	0.36	5.5	349	**0.41**	**6.3**	**384**
					3N37	0.41	6.3	360	**0.47**	**7.3**	**399**
					3N38	0.54	8.3	387	**0.58**	**9.0**	**424**
					N105	0.60	9.3	402	**0.65**	**10.1**	**444**
8.4	**130**	RN	Rainier	32.0	N340	0.35	5.4	344	**0.40**	**6.2**	**375**
					N350	0.38	5.9	347	**0.45**	**6.9**	**388**
					3N37	0.41	6.3	355	**0.47**	**7.2**	**392**
9.4	**145**	LRN	Intercast	32.0	N340	0.28	4.3	315	**0.33**	**5.2**	**350**
					3N37	0.36	5.5	329	**0.41**	**6.3**	**368**
					N350	0.33	5.1	319	**0.39**	**6.0**	**358**
9.5	**147**	HP/XTP	Hornady	32.0	N340	0.33	5.1	315	**0.38**	**5.9**	**354**
					3N37	0.38	5.9	334	**0.44**	**6.8**	**372**
					N350	0.37	5.7	327	**0.42**	**6.5**	**364**
					3N38	0.50	7.7	366	**0.52**	**8.0**	**373**
					N105	0.51	7.8	360	**0.55**	**8.4**	**394**
9.5	**147**	RN	Rainier	32.0	N340	0.32	5.0	321	**0.37**	**5.7**	**348**
					N350	0.34	5.3	307	**0.40**	**6.1**	**345**
					3N37	0.36	5.5	316	**0.41**	**6.3**	**349**

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

.38 Super Lapua

Test barrel: 140 mm, 1 in 16" twist
Primers: Small Pistol
Cases: LAPUA, trim-to length 22.70 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
7.5	**115**	FMJ	LAÅUA	31.5	N340	0.36	5.6	363	**0.41**	**6.3**	**432**
					3N37	0.44	6.8	383	**0.48**	**7.4**	**434**
					3N38	0.56	8.6	413	**0.63**	**9.7**	**458**
8.0	**124**	FMJ	LAPUA	32.0	N340	0.36	5.6	361	**0.40**	**6.2**	**405**
					3N37	0.44	6.8	382	**0.47**	**7.3**	**410**
					3N38	0.54	8.3	386	**0.59**	**9.1**	**436**
8.4	**130**	FMJ	Sierra	32.0	N340	0.34	5.2	356	**0.39**	**6.0**	**388**
					3N37	0.42	6.5	364	**0.46**	**7.1**	**399**
					3N38	0.50	7.7	380	**0.57**	**8.8**	**433**

.38 Special

Test barrel: 170 mm, 1 in 18" twist
Primers: Small Pistol
Cases: Sako, trim-to length 29.10 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
7.1	**110**	HP/XTP	Hornady	36.5	N320	0.37	5.7	362	**0.41**	**6.3**	**403**
					N340	0.42	6.5	363	**0.46**	**7.1**	**400**
					3N37	0.50	7.7	373	**0.55**	**8.4**	**414**
					N350	0.46	7.1	374	**0.52**	**8.0**	**412**
8.0	**124**	LSWC	Intercast	36.5	N320	0.31	4.8	329	**0.35**	**5.4**	**368**
					N340	0.39	6.0	343	**0.43**	**6.6**	**381**
					3N37	0.43	6.6	346	**0.47**	**7.3**	**380**
					N350	0.41	6.4	351	**0.46**	**7.2**	**382**
8.1	**125**	FP/XTP	Hornady	36.5	N320	0.34	5.3	318	**0.38**	**5.9**	**356**
					N340	0.40	6.2	336	**0.45**	**6.9**	**373**
					3N37	0.46	7.2	340	**0.50**	**7.7**	**383**
					N350	0.45	7.0	345	**0.51**	**7.9**	**390**
8.1	**125**	FP	Rainier	36.5	N320	0.31	4.7	310	**0.35**	**5.4**	**345**
					N340	0.37	5.7	325	**0.43**	**6.6**	**364**
					N350	0.41	6.3	326	**0.47**	**7.2**	**370**
					3N37	0.43	6.6	333	**0.49**	**7.5**	**379**
9.1	**140**	HP	Speer	36.5	N320	0.32	5.0	291	**0.36**	**5.6**	**338**
					N340	0.38	5.8	299	**0.42**	**6.4**	**347**
					3N37	0.43	6.6	308	**0.48**	**7.4**	**360**
					N350	0.42	6.4	306	**0.46**	**7.1**	**354**
9.4	**145**	LSWC	Intercast	37.5	N320	0.27	4.1	286	**0.31**	**4.7**	**318**
					N340	0.35	5.3	315	**0.39**	**6.0**	**356**
					3N37	0.37	5.6	305	**0.40**	**6.2**	**342**
					N350	0.38	5.8	318	**0.44**	**6.7**	**363**

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

.38 Special

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
9.5	**147**	JHP	Speer	35.0	N340	0.32	5.0	281	**0.37**	**5.7**	**321**
					3N37	0.37	5.7	284	**0.41**	**6.3**	**326**
					N350	0.36	5.6	284	**0.40**	**6.2**	**322**
9.6	**148**	LWC	Sako	30.0	N320	0.21	3.2	250	**0.24**	**3.7**	**277**
					N330	0.23	3.6	256	**0.26**	**4.1**	**290**
					N340	0.25	3.9	263	**0.28**	**4.4**	**294**
					N350	0.28	4.3	272	**0.31**	**4.8**	**307**
					N340	0.34	5.2	267	**0.38**	**5.9**	**319**
					3N37	0.40	6.1	279	**0.44**	**6.8**	**320**
					N350	0.38	5.9	282	**0.43**	**6.7**	**325**
10.2	**158**	FP	Rainier	37.5	N320	0.28	4.3	257	**0.33**	**5.1**	**298**
					N340	0.34	5.3	268	**0.39**	**6.1**	**311**
					N350	0.38	5.9	281	**0.43**	**6.7**	**321**
					3N37	0.39	6.1	282	**0.44**	**6.9**	**326**
10.4	**158**	LFN	Intercast	37.5	N340	0.35	5.4	315	**0.39**	**6.0**	**351**
					3N37	0.37	5.7	298	**0.42**	**6.5**	**340**
					N350	0.37	5.7	309	**0.41**	**6.3**	**340**

.357 Magnum

Test barrel: 175 mm, 1 in 18½" twist
Primers: Small Rifle
Cases: Remington, trim-to length 32.60 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
7.1	**110**	HP/XTP	Hornady	40.0	N310	0.40	6.2	395	**0.44**	**6.7**	**417**
					N320	0.48	7.4	424	**0.52**	**8.0**	**449**
					N340	0.55	8.5	444	**0.61**	**9.4**	**481**
					3N37	0.61	9.5	468	**0.69**	**10.7**	**502**
					N350	0.64	9.9	472	**0.70**	**10.8**	**502**
					N110	1.20	18.5	523	**1.30**	**20.1**	**582**
8.0	**124**	LSWC	Intercast	41.0*)	N340	0.51	7.9	419	**0.57**	**8.8**	**448**
					N350	0.54	8.3	423	**0.60**	**9.3**	**451**
					N110	1.02	15.7	471	**1.13**	**17.4**	**518**
8.1	**125**	FP/XTP	Hornady	40.0	N310	0.36	5.5	346	**0.40**	**6.1**	**376**
					N320	0.40	6.2	375	**0.46**	**7.1**	**405**
					N340	0.51	7.8	412	**0.57**	**8.8**	**446**
					N350	0.57	8.7	431	**0.63**	**9.7**	**461**
					N110	1.09	16.8	488	**1.19**	**18.4**	**540**

*) The CIP maximum cartridge overall length is exceeded.

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

.357 Magnum

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
9.1	**140**	HP	Speer	40.0	N340	0.49	7.6	381	**0.54**	**8.3**	**409**
					3N37	0.54	8.3	390	**0.60**	**9.3**	**422**
					N350	0.53	8.2	390	**0.59**	**9.1**	**421**
					N110	1.02	15.7	457	**1.11**	**17.1**	**502**
9.4	**145**	LSWC	Intercast	41.0*)	N320	0.38	5.8	358	**0.42**	**6.4**	**380**
					N340	0.43	6.6	377	**0.48**	**7.4**	**402**
					3N37	0.49	7.5	387	**0.55**	**8.5**	**417**
					N350	0.44	6.8	375	**0.52**	**8.1**	**410**
					N110	0.91	14.0	450	**0.99**	**15.3**	**485**
10.2	**158**	HP	Speer	40.0	N320	0.37	5.7	312	**0.41**	**6.3**	**340**
					N340	0.44	6.7	340	**0.48**	**7.4**	**365**
					3N37	0.48	7.4	351	**0.54**	**8.3**	**382**
					N350	0.49	7.6	366	**0.55**	**8.5**	**389**
10.2	**158**	FP/XTP	Hornady	40.0	N105	0.71	10.9	402	**0.77**	**11.9**	**432**
10.2	**158**	HP	Speer	40.0	N110	0.91	14.1	417	**0.99**	**15.3**	**458**
10.4	**160**	LFN	Intercast	40.0	N340	0.41	6.3	360	**0.46**	**7.1**	**379**
					3N37	0.47	7.3	358	**0.52**	**8.0**	**388**
					N350	0.43	6.6	363	**0.49**	**7.6**	**387**
					N110	0.85	13.2	428	**0.93**	**14.4**	**462**
11.7	**180**	TERA	LAPUA	42.6*)	N340	0.38	5.8	283	**0.42**	**6.4**	**301**
					3N37	0.40	6.2	281	**0.46**	**7.1**	**313**
					N350	0.39	6.0	273	**0.45**	**7.0**	**310**
					N110	0.77	11.9	360	**0.83**	**12.8**	**397**
11.7	**180**	TMJ	Speer	42.6*)	N340	0.41	6.3	296	**0.46**	**7.1**	**326**
					3N37	0.45	7.0	309	**0.51**	**7.9**	**341**
					N350	0.42	6.4	293	**0.48**	**7.4**	**331**
					N105	0.58	8.9	352	**0.66**	**10.3**	**384**
					N110	0.82	12.7	382	**0.91**	**14.0**	**425**
13.0	**200**	TMJ	Speer	43.1*)	3N37	0.41	6.4	272	**0.47**	**7.2**	**302**
					N350	0.40	6.2	255	**0.46**	**7.1**	**295**
					N105	0.55	8.4	311	**0.61**	**9.4**	**342**
					N110	0.74	11.4	337	**0.80**	**12.4**	**367**

*) The CIP maximum cartridge overall length is exceeded.

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

.357 Remington Maximum

Test barrel: 300 mm, 1 in 18½" twist
Primers: Small Rifle
Cases: Remington, trim-to length 40.60 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
10.2	**158**	FP/XTP	Hornady	48.0	3N37	0.66	10.1	439	**0.73**	**11.3**	**476**
					N350	0.56	8.6	409	**0.70**	**10.7**	**466**
					N105	0.85	13.1	485	**1.02**	**15.7**	**549**
					N110	1.14	17.5	529	**1.26**	**19.4**	**575**
10.2	**158**	FP	Rainier	48.0	N350	0.63	9.7	399	**0.77**	**11.8**	**467**
					3N37	0.62	9.5	409	**0.74**	**11.4**	**469**
					N105	0.86	13.3	490	**1.04**	**16.0**	**551**
					N110	1.21	18.6	530	**1.31**	**20.2**	**578**
10.4	**160**	LFN	Intercast	48.0	3N37	0.59	9.1	444	**0.71**	**10.9**	**479**
					N350	0.62	9.5	440	**0.69**	**10.6**	**471**
					N105	0.87	13.4	517	**1.05**	**16.2**	**572**
11.7	**180**	Silhoutte	Nosler	48.1	N105	0.79	12.2	443	**0.92**	**14.2**	**499**
					N110	1.00	15.5	475	**1.12**	**17.2**	**517**
					N120	1.32	20.4	489	**1.45**	**22.4**	**534**
13.0	**200**	TMJ	Speer	50.8*)	N110	0.92	14.2	415	**1.04**	**16.0**	**457**
					N120	1.23	18.9	426	**1.35**	**20.8**	**479**

*) The CIP maximum cartridge overall length is exceeded.

.40 S.&W.

Test barrel: 140 mm, 1 in 16" twist
Primers: Small Pistol
Cases: Remington, trim-to length 21.40 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
10.0	**155**	HP-XTP	Hornady	28.6	N320	0.34	5.2	337	**0.38**	**5.9**	**363**
					N330	0.39	6.0	348	**0.43**	**6.7**	**376**
					N340	0.39	6.0	345	**0.45**	**6.9**	**381**
					3N37	0.47	7.3	357	**0.53**	**8.1**	**392**
					N350	0.43	6.6	351	**0.50**	**7.6**	**385**
10.0	**155**	FP	Rainier	28.6	N320	0.34	5.3	331	**0.38**	**5.9**	**357**
					N330	0.39	6.0	344	**0.43**	**6.7**	**373**
					N340	0.41	6.4	352	**0.47**	**7.3**	**389**
					N350	0.46	7.2	357	**0.52**	**8.1**	**395**
					3N37	0.49	7.5	359	**0.55**	**8.5**	**394**
11.0	**170**	HP	Hornady	28.6	N340	0.34	5.3	313	**0.40**	**6.1**	**346**
					3N37	0.39	6.0	322	**0.45**	**7.0**	**355**
					N350	0.38	5.8	322	**0.44**	**6.8**	**354**

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

.40 S.&W.

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
11.7	**180**	HP	Speer	28.6	N340	0.35	5.5	305	**0.40**	**6.1**	**338**
					3N37	0.38	5.8	303	**0.44**	**6.8**	**340**
					N350	0.38	5.9	319	**0.44**	**6.7**	**348**
13.0	**200**	TMJ	Speer	28.6	N340	0.30	4.7	267	**0.35**	**5.4**	**298**
					3N37	0.33	5.1	265	**0.39**	**6.0**	**301**
					N350	0.34	5.3	272	**0.39**	**6.0**	**302**
					N105	0.49	7.5	321	**0.52**	**8.0**	**345**

10mm AUTO

Test barrel: 140 mm, 1 in 16" twist
Primers: Large Pistol
Cases: Winchester, trim-to length 25.00 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
10.0	**155**	HP-XTP	Hornady	31.9	N340	0.43	6.7	355	**0.49**	**7.6**	**392**
					3N37	0.47	7.2	359	**0.56**	**8.6**	**401**
					N350	0.46	7.1	359	**0.55**	**8.4**	**401**
10.0	**155**	FP	Rainier	31.9	N340	0.47	7.2	369	**0.52**	**8.0**	**403**
					N350	0.52	8.0	379	**0.58**	**8.9**	**420**
					3N37	0.53	8.2	373	**0.58**	**9.0**	**410**
11.7	**180**	HP	Speer	31.9	N340	0.39	6.0	312	**0.44**	**6.9**	**352**
					3N37	0.43	6.6	333	**0.50**	**7.8**	**366**
					N350	0.38	5.9	328	**0.47**	**7.2**	**361**
					N105	0.60	9.3	372	**0.68**	**10.5**	**408**
13.0	**200**	FMJ/FP	Hornady	31.9	N340	0.32	5.0	267	**0.37**	**5.7**	**309**
					3N37	0.38	5.9	291	**0.44**	**6.8**	**327**
					N350	0.34	5.3	284	**0.41**	**6.3**	**319**
					N105	0.50	7.7	325	**0.56**	**8.6**	**352**

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

.41 Remington Magnum

Test barrel: 150 mm, 1 in 18¾" twist
Primers: Large Pistol
Cases: W-W Super, trim-to length 32.65 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
11.0	**170**	JHC	Sierra	40.1	N350	0.72	11.1	417	**0.84**	**13.0**	**465**
					N105	0.99	15.3	469	**1.13**	**17.5**	**515**
					N110	1.41	21.7	504	**1.53**	**23.5**	**547**
13.6	**210**	HP/XTP	Hornady	40.1	N350	0.67	10.4	372	**0.76**	**11.8**	**408**
					N105	0.84	13.0	405	**0.98**	**15.1**	**448**
					N110	1.20	18.5	436	**1.31**	**20.3**	**476**

.44 S.&W. Special

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

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
11.7	**180**	HP-XTP	Hornady	37.3	N320	0.44	6.8	285	**0.49**	**7.5**	**315**
					N330	0.50	7.7	308	**0.56**	**8.6**	**338**
					N340	0.57	8.8	319	**0.62**	**9.5**	**349**
					N350	0.64	9.9	318	**0.68**	**10.5**	**350**
13.0	**200**	HP-XTP	Hornady	37.3	N320	0.41	6.4	270	**0.45**	**7.0**	**294**
					N330	0.50	7.7	287	**0.55**	**8.5**	**315**
					N340	0.54	8.3	293	**0.59**	**9.1**	**325**
					N350	0.59	9.1	296	**0.64**	**9.9**	**329**
14.3	**220**	FPJ-Match	Sierra	37.3	N320	0.34	5.2	221	**0.39**	**5.9**	**255**
					N330	0.40	6.2	232	**0.46**	**7.0**	**271**
					N340	0.43	6.6	248	**0.48**	**7.4**	**278**
					N350	0.50	7.7	254	**0.56**	**8.6**	**289**
15.6	**240**	JTC-Sil	Hornady	37.6	N320	0.31	4.9	193	**0.36**	**5.6**	**223**
					N330	0.35	5.5	206	**0.40**	**6.2**	**234**
					N340	0.41	6.3	222	**0.46**	**7.1**	**252**
					N350	0.49	7.5	239	**0.53**	**8.2**	**271**
16.2	**250**	FPJ-Match	Sierra	37.3	N320	0.31	4.7	193	**0.36**	**5.5**	**226**
					N330	0.32	5.0	191	**0.39**	**6.0**	**228**
					N340	0.36	5.5	197	**0.42**	**6.5**	**237**
					N350	0.44	6.7	229	**0.49**	**7.6**	**260**
17.3	**267**	LFN	Intercast	39.1	N320	0.34	5.3	242	**0.39**	**6.0**	**262**
					N330	0.41	6.3	261	**0.45**	**7.0**	**281**
					N340	0.42	6.5	256	**0.46**	**7.1**	**278**
					N350	0.47	7.3	259	**0.52**	**8.0**	**282**

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

.44 Remington Magnum

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

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
11.7	**180**	HP-XTP	Hornady	40.7	N320	0.66	10.2	396	**0.76**	**11.7**	**434**
					N340	0.81	12.5	427	**0.91**	**14.0**	**469**
					N350	0.85	13.2	436	**0.98**	**15.2**	**478**
					N110	1.60	24.7	483	**1.70**	**26.2**	**514**
13.0	**200**	HP-XTP	Hornady	40.7	N320	0.62	9.6	371	**0.73**	**11.2**	**406**
					N340	0.73	11.3	400	**0.84**	**12.9**	**435**
					3N37	0.86	13.2	423	**0.97**	**15.0**	**459**
					N350	0.79	12.1	402	**0.94**	**14.5**	**450**
					N105	1.03	15.9	444	**1.24**	**19.2**	**497**
					N110	1.53	23.7	481	**1.70**	**26.2**	**527**
14.3	**220**	FPJ-Match	Sierra	40.7	N320	0.56	8.6	341	**0.67**	**10.3**	**373**
					N340	0.69	10.7	372	**0.79**	**12.2**	**403**
					N350	0.78	12.1	388	**0.95**	**14.6**	**436**
15.6	**240**	JTC-Sil	Hornady	40.7	N320	0.56	8.7	323	**0.63**	**9.7**	**352**
					N340	0.64	9.9	350	**0.74**	**11.4**	**378**
					3N37	0.75	11.6	361	**0.86**	**13.2**	**399**
					N350	0.75	11.6	366	**0.82**	**12.7**	**397**
					N105	0.90	13.9	392	**1.07**	**16.4**	**434**
					N110	1.28	19.8	422	**1.42**	**21.9**	**467**
16.2	**250**	FPJ-Match	Sierra	40.7	N320	0.52	8.1	303	**0.62**	**9.6**	**342**
					N340	0.62	9.6	331	**0.72**	**11.1**	**367**
					N350	0.71	11.0	356	**0.84**	**13.0**	**392**
17.3	**267**	LFN	Intercast	42.7*)	N340	0.66	10.1	350	**0.74**	**11.4**	**374**
					3N37	0.74	11.4	355	**0.85**	**13.1**	**389**
					N350	0.71	10.9	351	**0.82**	**12.6**	**382**
					N110	1.29	19.8	412	**1.40**	**21.7**	**447**
19.4	**300**	HP-XTP	Hornady	43.6	N340	0.60	9.2	297	**0.67**	**10.4**	**322**
					N350	0.65	10.1	305	**0.75**	**11.6**	**341**
					N110	1.17	18.1	371	**1.30**	**20.1**	**416**
19.4	**300**	JSP	Sierra	43.6	N340	0.59	9.1	288	**0.66**	**10.1**	**317**
					3N37	0.62	9.6	295	**0.72**	**11.1**	**330**
					N350	0.61	9.4	285	**0.71**	**10.9**	**324**
					N105	0.79	12.2	332	**0.89**	**13.7**	**366**
					N110	1.12	17.3	359	**1.23**	**18.9**	**395**

*) The CIP maximum cartridge overall length is exceeded.

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

.45 AUTO

Test barrel: 150 mm, 1 in 16" twist
Primers: Large Pistol
Cases: Remington, trim-to length 22.70 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
10.0	**154**	LSWC	Intercast	31.5	N320	0.39	5.9	320	**0.42**	**6.5**	**346**
					N340	0.50	7.7	349	**0.54**	**8.3**	**374**
11.7	**180**	LSWC	Intercast	31.6	N320	0.36	5.5	301	**0.40**	**6.1**	**326**
					N340	0.45	6.9	316	**0.49**	**7.5**	**342**
13.0	**200**	FN	Rainier	30.5	N320	0.38	5.9	296	**0.43**	**6.6**	**331**
					N340	0.48	7.4	309	**0.54**	**8.3**	**351**
					N350	0.58	9.0	331	**0.63**	**9.7**	**376**
12.0	**185**	TMJ-SWC	Speer	32.2	N320	0.37	5.7	283	**0.40**	**6.2**	**306**
					N340	0.47	7.2	308	**0.51**	**7.8**	**335**
13.0	**200**	LSWC	Intercast	31.5	N320	0.31	4.8	275	**0.34**	**5.2**	**296**
					N340	0.40	6.2	299	**0.44**	**6.7**	**321**
13.0	**200**	FMJ-CT	Hornady	31.5	N320	0.33	5.0	265	**0.36**	**5.5**	**287**
					N340	0.41	6.3	281	**0.45**	**6.9**	**305**
					N350	0.44	6.8	284	**0.48**	**7.5**	**308**
14.9	**230**	FMJ-RN	Hornady	32.0	N320	0.32	4.9	243	**0.34**	**5.3**	**263**
					N340	0.39	6.0	258	**0.42**	**6.5**	**283**
					N350	0.44	6.8	262	**0.48**	**7.3**	**285**

.45 Colt

Test barrel: 150 mm, 1 in 16" twist
Primers: Large Pistol
Cases: Remington, trim-to length 32.50 mmm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
11.7	**180**	LSWC	Intercast	40.5	N320	0.55	8.5	341	**0.60**	**9.3**	**367**
					N330	0.66	10.2	362	**0.71**	**11.0**	**389**
					N340	0.69	10.6	362	**0.74**	**11.4**	**391**
					N350	0.75	11.6	363	**0.83**	**12.8**	**399**
12.0	**185**	FN	Rainier	40.5	N320	0.57	8.8	328	**0.62**	**9.6**	**358**
					N330	0.67	10.3	333	**0.73**	**11.3**	**367**
					N340	0.72	11.1	343	**0.78**	**12.0**	**383**
					N350	0.80	12.3	346	**0.88**	**13.6**	**389**
12.0	**185**	HP/XTP	Hornady	40.5	N320	0.57	8.8	334	**0.62**	**9.6**	**360**
					N340	0.71	11.0	342	**0.76**	**11.7**	**377**
					N350	0.80	12.3	346	**0.86**	**13.3**	**382**
13.0	**200**	FMJ-CT	Hornady	40.5	N320	0.52	8.0	317	**0.58**	**9.0**	**342**
13.0	**200**	LSWC	Hornady	40.5	N320	0.56	8.6	326	**0.61**	**9.4**	**347**
					N340	0.70	10.8	341	**0.75**	**11.6**	**364**

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

.45 Colt

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
13.0	**200**	FMJ-CT	Hornady	40.5	N320	0.52	8.0	317	**0.58**	**9.0**	**342**
13.0	**200**	LSWC	Hornady	40.5	N320	0.56	8.6	326	**0.61**	**9.4**	**347**
					N340	0.70	10.8	341	**0.75**	**11.6**	**364**
14.9	**230**	FMJ-Match	Sierra	40.5	N320	0.49	7.6	286	**0.54**	**8.3**	**306**
					N340	0.63	9.7	301	**0.68**	**10.5**	**330**
16.2	**250**	HP/XTP	Hornady	40.5	N320	0.47	7.3	257	**0.51**	**7.9**	**280**
					N340	0.60	9.3	281	**0.64**	**9.9**	**307**
					N350	0.69	10.6	297	**0.72**	**11.1**	**321**
					N105	0.91	14.0	296	**0.97**	**15.0**	**344**

.45 Winchester Magnum

Test barrel: 300 mm, 1 in 16" twist
Primers: Winchester WLP
Cases: Winchester, trim-to length 30.30

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
12.0	**185**	HP/XTP	Hornady	38.5	3N37	0.97	15.0	520	**1.09**	**16.8**	**547**
					N350	0.90	13.9	481	**1.08**	**16.7**	**542**
					N105	1.23	19.0	549	**1.43**	**22.1**	**602**
13.0	**200**	TMJ-SWC	Speer	38.5	3N37	0.95	14.7	500	**1.04**	**16.0**	**526**
13.0	**200**	FMJ-CT	Hornady	39.5	N105	1.15	17.7	507	**1.31**	**20.2**	**556**
13.0	**200**	TMJ-SWC	Speer	38.5	N110	1.56	24.1	551	**1.71**	**26.4**	**598**
14.9	**230**	FMJ-RN	Hornady	39.5	3N37	0.87	13.4	430	**0.97**	**15.0**	**471**
					N110	1.48	22.8	513	**1.62**	**25.0**	**550**
16.2	**250**	HP/XTP	Hornady	38.2	N350	0.71	11.0	341	**0.84**	**13.0**	**405**
					3N37	0.79	12.2	377	**0.87**	**13.4**	**424**
					N105	0.96	14.8	412	**1.09**	**16.8**	**450**
					N110	1.28	19.8	461	**1.45**	**22.4**	**500**

BOLD TEXT INDICATES MAXIMUM LOAD - USE WITH CAUTION!
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.454 Casull

Test barrel: 190 mm, 1 in 24" twist
Primers: Small Rifle
Cases: Starline, trim-to length 35.05

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
12.0	**185**	HP/XTP	Hornady	41.7*	3N37	1.14	17.6	534	**1.36**	**21.0**	**598**
					N350	1.18	18.2	540	**1.39**	**21.4**	**597**
					N105	1.72	26.6	610	**1.90**	**29.3**	**658**
14.6	**225**	JHP	Speer	42.7	3N37	1.09	16.8	475	**1.27**	**19.6**	**524**
					N105	1.59	24.6	538	**1.73**	**26.7**	**583**
					N110	2.00	30.8	568	**2.17**	**33.5**	**611**
16.2	**250**	HP/XTP	Hornady	42.8	3N37	1.01	15.6	438	**1.18**	**18.2**	**488**
					N105	1.39	21.4	483	**1.57**	**24.3**	**538**
					N110	1.82	28.1	524	**1.99**	**30.7**	**571**
19.4	**300**	UCHP	Speer	44.5	3N37	0.99	15.2	395	**1.10**	**17.0**	**431**
					N105	1.28	19.7	429	**1.49**	**23.0**	**484**
					N110	1.71	26.3	474	**1.86**	**28.7**	**514**

*) The bullet crimp is over the ogive.

.50 AE

Test barrel: 150 mm, 1 in 19" twist
Primers: Large Pistol
Cases: Speer, trim-to length 32.40

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
19.4	**300**	JHP	IMI	40.0	N105	1.26	19.5	395	**1.38**	**21.3**	**437**
					N110	1.64	25.3	396	**1.86**	**28.6**	**457**
					N120	2.11	32.5	362	**2.33**	**36.0**	**417**
21.1	**325**	UCHP	Speer	40.0	N105	1.15	17.7	356	**1.26**	**19.5**	**407**
					N110	1.56	24.1	387	**1.75**	**27.0**	**445**
					N120	1.99	30.7	347	**2.23**	**34.5**	**408**

NOTES

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 peeks involved in detonation can destroy the weapon and may lead to serious injury.

All these loads given here are extensively pressure tested and no sings 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: 125mm, 1 in18" twist
Primers: Small Pistol
Cases: Remington, trim-to length 29.1 mm

Bullet					Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	Weight		Velocity
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	[g]	[grs]	[m/s]
10.3	**158**	LSWC/HP		36.5	N320	0.21	3.3	230	**0.25**	**3.8**	**256**
					N330	0.23	3.6	240	**0.27**	**4.1**	**269**

.357 Magnum

Test barrel: 150 mm, 1 in 18½" twist
Primers: Small Rifle
Cases: Remington, trim-to length 32.6 mm

Bullet				Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
10.3	**158**	LSWC/HP		40.0	N330	0.25	3.9	241	**0.32**	**5.0**	**304**
					N340	0.29	4.5	245	**0.38**	**5.9**	**320**

.44 S.&W. Special

Test barrel: 165 mm, 1 in 18" twist
Primers: Large Pistol
Cases: Remington, trim-to length 29.3 mm

Bullet				Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
15.6	**240**	SWC/HP		39.1	N320	0.30	4.7	214	**0.38**	**5.9**	**260**
					N330	0.36	5.5	229	**0.41**	**6.3**	**270**
17.3	**267**	LFN		39.1	N320	0.25	3.8	193	**0.34**	**5.3**	**242**
					N330	0.32	4.9	216	**0.38**	**5.9**	**254**
					N340	0.43	6.6	261	**0.47**	**7.3**	**282**

.44 Remington Magnum

Test barrel: 175 mm, 1 in 20" twist
Primers: Large Pistol
Cases: Remington, trim-to length 32.4 mm

Bullet				Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
17.3	**267**	LFN		40.0	N340	0.38	5.9	224	**0.49**	**7.5**	**288**

.45 Colt

Test barrel: 6", 1 in 16" twist
Primers: Large Pistol
Cases: Remington, trim-to length 32.5 mm

Bullet				Powder	Starting load			Maximum load		
Weight		Type	Mfg.	C.O.L.	Type	Weight		Velocity	**Weight**		**Velocity**
[g]	[grs]			[mm]		[g]	[grs]	[m/s]	**[g]**	**[grs]**	**[m/s]**
13.0	**200**	RN		40.5	N320	0.44	6.8	259	**0.56**	**8.7**	**318**
					N330	0.52	8.0	267	**0.56**	**8.6**	**298**
16.2	**250**	RN		40.5	N320	0.36	5.6	229	**0.45**	**6.9**	**279**
					N330	0.41	6.3	238	**0.49**	**7.5**	**293**

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

Unit Conversions

1 g = 15.43 grains
1 grain = 0.0648 g
1 MPa = 145.036 psi
1 psi = 0.00689 MPa
1 m/s = 3.2808 fps
1 fps = 0.3048 m/s
1 mm = 0.03937 in.
1 in. = 25.4 mm
1 m = 1.0936 yds
1 yd. = 0.9144 m
1 J = 0.73757 ft. lbs
1 ft. lbs = 1.3558 J

NOTES

Dear Customer,

The **Vihtavuori Powders** are available wordwide thorough our distributors listed below:

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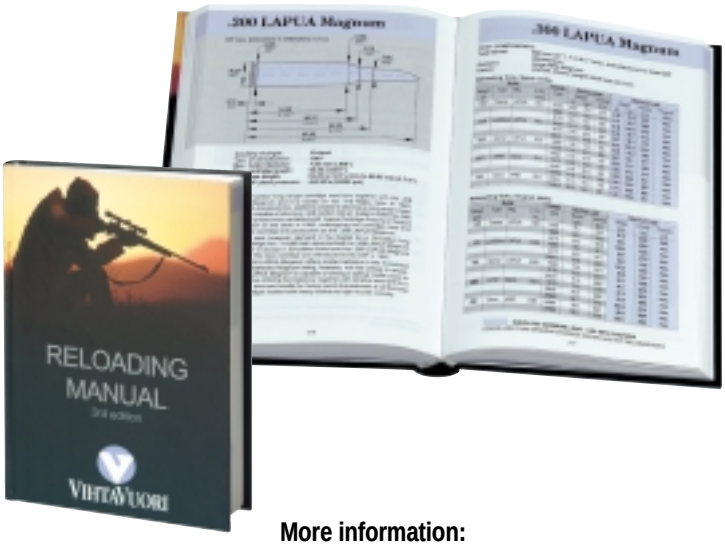

More information:
Vihtavuori Reloading Manual , 3rd edition

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