

# **TIROPRACTICO**

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## **ALLIANT RELOADER MANUAL**

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**In collaborazione con TIROPRACTICO®<sup>WEB</sup>**

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## Caution

Millions of men and women reload ammunition as a hobby or because the cost savings allow them to do more shooting. In order to become or to continue as a safe reloader, **you must be cautious and careful**. You are the production department and the quality control department. Later, when you shoot the ammunition that only you produced and checked, you are the person closest to the gun if it malfunctions because of faulty ammunition — yours.

**Remember—you are dealing with an explosive material. You become a “miniature” manufacturer working with powders and primers that can, if misused, explode or burn, causing serious personal injury (including death) and property damage.**

**Read and study one or more good books that describe reloading techniques in detail. When using smokeless powders, use only the exact type and quantity recommended herein. Store and use smokeless powders—your powders—according to the safety rules listed in this booklet. Reload for quality, so that the safest and most accurate loads on the shooting line will be yours.**

## Ballistics

The ballistic data shown in this booklet were obtained in the laboratory under strictly controlled conditions. **You must load only those exact combinations that are listed.** Even then, different reloading techniques, plus industrial tolerances of each component, likely will cause your ammunition, or ammunition loaded by other competent laboratories, to yield slightly different ballistic data. Therefore, **charge recommendations in this booklet must never be exceeded.** Smart shooters and hunters know that accuracy, not maximum power, is their key to success.

## Disclaimer

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## Powder Warnings

- **NEVER** substitute smokeless powder for black powder, or for Pyrodex, or for any other smokeless powder.
- **NEVER** mix together any two powders, regardless of type, brand, style, or source.
- **NEVER** use the data in this *Reloaders’ Guide* for any other powders, even if advertised “similar to Bullseye” or “burns the same as Red Dot,” etc.

*Violation of any of the above could result in severe personal injury (including death) or gun damage.*

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**WARNING: The shotgun shell loading data in this booklet are for lead shot only. Steel shot cannot be substituted. Also, do not use buffers or fillers of any kind.**



## Smokeless Powders for Reloading

We currently offer 14 powders for use in reloading. These are listed in the order of decreasing burning rates. Each powder listed is “slower” than those preceding it and “faster” than those following it. Among these Alliant smokeless powders, for example, Red Dot® burns more slowly than Bullseye®, but faster than Green Dot®.

Powder	Principal Use <sup>1</sup>	Can Also be Used In <sup>1</sup>
Bullseye®	Handgun Loads	12-Gauge Light Target Loads
Red Dot®	Light and Standard Shotgun Loads, 12-, 16-, and 20-Gauge	Handgun Loads
American Select™	12-Gauge Target Loads	Handgun Loads
Green Dot®	Standard and Medium Shotgun Loads, 12-, 16-, and 20-Gauge	Handgun Loads
Unique®	All-Around Shotgun Powder, 12-, 16-, 20-, and 28-Gauge	Handgun Loads
<b>POWER PISTOL™</b>	High performance pistol loads such as the 9mm, .40 S&W, and 10mm	Moderate pressure pistol cartridges like the .38 Special, .380 Auto, and .45 ACP
Herco®	Heavy Shotgun Loads, 10-, 12-, 16-, 20-, and 28-Gauge	Heavy Handgun Loads
Blue Dot®	Magnum Shotgun Loads, 10-, 12-, 16-, 20-, and 28-Gauge	Magnum Handgun Loads
2400®	Magnum Handgun Loads	Some Rifle and Shotgun Loads
Reloder® 7	Light Rifle Loads	Silhouette Loads
Reloder® 12	Medium Rifle Loads	Silhouette Loads
Reloder® 15	Medium Rifle Loads	Silhouette Loads
Reloder® 19	Magnum Rifle Loads	Target and hunting rifle loads
Reloder® 22	Magnum Rifle Loads	Maximum hunting loads

<sup>1</sup>Use only in the loads printed in this Guide.

## Packaging

Powder	1-lb Canister	4-lb Canister	5-lb Canister	8-lb Keg
Bullseye, Red Dot, American Select, Green Dot, Unique, Herco, 2400	x	x		x
Power Pistol™	x	x		
Blue Dot	x		x	
Reloder Series	x		x	

All 14 powders are always in stock at distributors' magazines throughout the U.S.A., and in most countries where reloading is legally permitted and popular. Any reloader unable to purchase any of the 14 powders at retail stores that handle powders should write to the address on the back cover. We cannot ship directly, but we will endeavor to correct supply shortages in your area.

## Powder Information

Smokeless sporting propellants are of two basic types – single-base and double-base. Single-base propellants derive their energy from nitrocellulose and double-base from a combination of nitrocellulose and nitroglycerin. Alliant propellants range from the “near” single-base American Select (2% nitroglycerin) to the high nitroglycerin (40%) double-base Bullseye. In addition, our propellants contain stabilizers for long storage life and various other ballistic modifiers which reduce flash, improve combustion efficiency, and promote clean burning.

Some of our propellants also have a chemical coating on the surface to control the burning rate. This creates a progressive burn for achieving higher velocities at lower pressures. All of our propellants have a graphite glaze, which ensures smooth, consistent metering of charges through volumetric reloaders.

Alliant propellants are extruded and cut into circular flakes or cylinders by precision dies and cutting equipment. Granule size tolerances are very tight and uniform to prevent separation of different size granules and to ensure consistent ballistic performance, load after load.

By utilizing a precise combination of chemical formulation, granule size, and chemical coatings, we are able to tailor the burning characteristics of our propellants to achieve the best overall performance in a wide range of loads.

Because each of our propellants is specifically engineered to have different burn rates and performance characteristics, **NEVER BLEND OR MIX DIFFERENT POWDERS, AND USE ONLY THE GRADE AND QUANTITY RECOMMENDED IN THIS RELOADER'S GUIDE.**

All powders burn with great precision and rapidly inside the gun chamber, generating the hot, high-pressure gas that accelerates the bullet (or shot) and drives it toward the target. **It is critically important for safety that the powder used is matched to the bullet (or shot) weight and other factors; otherwise, the gun parts may be deformed or may even burst and cause serious personal injury (including death).** Shot-to-shot accuracy can also be degraded by deviations from recommended loads. Even after 80 years of producing and testing powders, ballisticians are unable to calculate and predict exact ballistic results; we must test-fire our powders with each set of components and record the results. Therefore, **the ballistic values and recommended combinations listed in this booklet must be followed without deviation.**

**Working up charges.** For shotgun loads, use the charge weight shown. However, for all rifle and pistol loads, first load and fire a few cartridges at 10% less charge than is shown, watching for any sign of excessive pressure (difficult extraction, flattened or blown primers, unusual recoil).

**Handgun loads.** Many pistol and revolver loads require only small amounts of fast-burning powders; therefore: (1) guard against accidental double charges, and even multiple charges, whether loading with handtools or with progressive loading devices; (2) be sure that each bullet is positioned in the case so that the minimum overall length is not violated.

### Dram Equivalent

Prior to the commercialization of smokeless powder, shotgun shells were loaded with black powder. The weight measurement system used for black powder was “drams.” Compared with black powder, **smokeless powder is more dense and MUCH more energetic, so it cannot safely be measured and used like black powder.** Indeed, a different weight system was selected for smokeless powder: “grains,” wherein 7,000 grains equal one pound.

Since many shooters still wanted to be able to compare their smokeless powder loads with the original black powder loads, the term “dram equivalent” evolved. Simply stated, the dram equivalent is an indicator of the velocity of a particular shot load. **But note that the charge and weight of smokeless powder must not be calculated from the dram equivalent.**

### Notice

We have inserted information on the properties and storage of smokeless powder for your understanding, so that you can avoid unnecessary risks when using it. This information, on pages 8 and 9, was published initially by the Sporting Arms and Ammunition Manufacturers' Institute, Inc., several years ago in the interest of safety. You must read these pages carefully and comply with the precautions listed. If you have questions, please call or write to us at the address on the back cover.

# Important Safety and Health Precautions

To perform in a gun, powders must ignite easily and burn rapidly. These characteristics require use of common sense to avoid accidents. **YOU MUST OBSERVE THESE PRECAUTIONS:**

1. **DO NOT** smoke when reloading.
2. **DO NOT** use spark-producing tools.
3. **DO NOT** mix powders of different kinds.
4. **DO NOT** leave powder where children can get it.
5. **DO NOT** try to load when distracted.
6. Avoid an open fire or working near spark-producing machinery.
7. Pour out only the amount of powder needed for immediate work.
8. Check the powder measure each time it is used. Make sure the settings have not been accidentally changed. Check-weigh “thrown charges” frequently.
9. Clean up any spilled powders. Use a brush and dustpan; do not use a vacuum cleaner. Dispose of spilled powder as described in the SAAMI pages of this Guide.
10. Store powder only in its original container, which was carefully designed for this usage. **DO NOT REPACKAGE.** Do not purchase or accept any Alliant powder not in its original, **FACTORY-SEALED** container.
11. Be sure the powder container is completely empty before discarding. Do not use the container to store other powders or materials, or for any other purpose.
12. Always keep in mind that smokeless powder is an explosive material and highly flammable. It should always be stored and handled in such a way as to avoid impact, friction, heat, sparks, or flame.
13. Wear safety glasses when reloading.
14. This material contains nitroglycerin. Inhalation, skin contact, or ingestion may cause severe headache, nausea, and lowering of blood pressure. **THEREFORE, THE FOLLOWING PRECAUTIONS MUST BE OBSERVED WHEN HANDLING POWDERS:**
  - A. Do not take internally. In case of ingestion, cause vomiting. Call a physician.
  - B. Avoid contamination of food, beverages, or smoking materials.
  - C. Avoid breathing dust. Ensure adequate ventilation during handling.
  - D. Wash thoroughly after handling and before eating, drinking, or smoking.
  - E. Do not carry powder in clothing.

You must also always remember:

1. Establish a routine for reloading. It will result in more uniform loads and less chance of error.
2. Some primers are more powerful than others (they produce more gas at a higher temperature). Use only the primers specified herein.
3. Shotshell wads differ in their sealing ability. Use only the load combinations specified herein.
4. If you use cast bullets, their diameter, hardness, lubrication, and crimp will affect the ballistics.
5. **The shotshell loads in this booklet are for use with LEAD SHOT ONLY!**
6. Use only the brands of powder and components shown in our tables. Do not substitute other types.
7. Discharging firearms in poorly ventilated areas, cleaning firearms, or handling ammunition may result in exposure to lead, a substance known to cause birth defects, reproductive harm, and other serious physical injury. Have adequate ventilation at all times. Wash hands and face thoroughly after handling and before coming in contact with food, chewing materials, and smoking material.

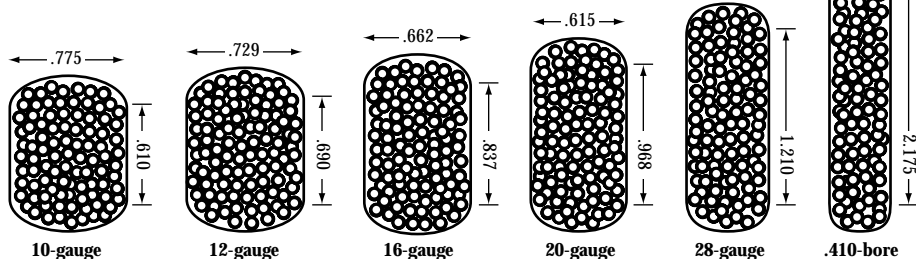
## Reference Tables

### Approximate Number of Pellets in Specific Weights of Lead Shot (Sizes 2 Through 9)

Weight, oz	No. 2	No. 4	No. 5	No. 6	No. 7½	No. 8	No. 8½	No. 9
½	45	67	85	112	175	205	242	292
¾	67	101	127	168	262	308	363	439
7/8	79	118	149	197	306	359	425	512
1	90	135	170	225	350	410	485	585
1¼	101	152	191	253	393	461	545	658
1½	112	169	213	281	437	513	605	731
1¾	124	186	234	309	481	564	665	804
1½	135	202	255	337	525	615	730	877

### Space Occupied by One Ounce of Shot in Various Gauges

(Values are Inches)



### Internal Diameter of the Barrel in Several Shotgun Gauges

- 10-Gauge—0.775-Inch
- 12-Gauge—0.729-Inch
- 16-Gauge—0.662-Inch
- 20-Gauge—0.615-Inch
- 28-Gauge—0.550-Inch
- .410-Bore—0.410-Inch

## Reference Tables (continued)

### Number of Shells That Can Be Loaded with One Pound of Powder at Various Grains Per Load

(The term grain is a measure of weight: 7,000 grains equal one pound)

Grains/ Load	Loads/ Pound	Grains/ Load	Loads/ Pound	Grains/ Load	Loads/ Pound	Grains/ Load	Loads/ Pound	Grains/ Load	Loads/ Pound	Grains/ Load	Loads/ Pound
12	583	23	304	34	205	45	156	56	125	67	104
13	538	24	291	35	200	46	152	57	123	68	103
14	500	25	280	36	194	47	149	58	121	69	101
15	466	26	269	37	189	48	146	59	119	70	100
16	437	27	259	38	184	49	143	60	117	71	99
17	411	28	250	39	179	50	140	61	115	72	97
18	388	29	241	40	175	51	137	62	113	73	96
19	368	30	233	41	170	52	135	63	111	74	95
20	350	31	225	42	166	53	132	64	109	75	93
21	333	32	218	43	162	54	130	65	108	76	92
22	318	33	212	44	159	55	127	66	106	77	91

### Typical Percentage of Pellets in a 30-Inch Circle at 40 Yards (Pattern) for Various Choke Sizes

(Choke is a Constriction at the Muzzle of a Shotgun Barrel)

Full Choke—70%

Improved Modified Choke—65 to 70%

Modified Choke—55%

Improved Cylinder—50%

True Cylinder—40%

## Ballistic Data

The velocity and pressure obtained with the specific combinations of shell, wad, primer, bullet or shot weight, powder, and powder weight provided in this booklet were obtained in a laboratory, where considerable effort is made to control the load and test conditions. Velocity was measured with a chronograph (electric stopwatch). Pressure was measured either by compressing copper cylinders, or electronically, by use of a piezoelectric transducer.

Guns are designed to take a considerable amount of internal pressure, but if this is exceeded, they burst violently. Be alert to signs of excess pressure, such as heavy recoil, flattened primers, or blown primers. Don't make changes in the suggested loads.

Tone variations (shaded areas) used in the reloading tables are for ease of reading and do not represent preferred loads.

Each shotshell table lists DRAM EQUIVALENT in the first column. This number is not used in any way during reloading. The quantity of powder to use is listed in GRAINS, which are a measure of weight, under each powder column.

Every reloader needs a good-quality scale for weighing each powder charge, or for checking the weight of powder thrown by volumetric loaders.

### Special Notes Regarding Components Other Than Powder

A. **Shotgun Shells.** Manufacturers may sell ammunition under different brand names that are identical for reloading purposes. Following are popular variations. When in doubt, consult the ammunition producer.

- Federal Hi Power Plastic same as Duck and Pheasant, Field, Game, and Dove and Squirrel or Top Gun.
- Federal Premium (Integral Base Wad)
- Remington-Peters. Same as Mohawk brand shells.
- Winchester AA-Type (Compression-Formed) same as AA Target, Upland and Super Double X.
- Winchester Polyformed Type (Reifenhauser Tube) same as Duck and Pheasant, Dove and Squirrel, and Sears Brand.

B. **Primers**

- CCI 109 and CCI 209 are ballistically identical and can be interchanged.
- CCI 209M (Magnum) is "hotter" and cannot be substituted for CCI 109 or 209. Use 209M only as listed.
- Rem. 209 is "hotter" and cannot be substituted for Rem. 97★ or Rem. 209P primer.
- Rem. 209P is interchangeable with Rem. 97★ primer.
- Federal 209A is "hotter" and cannot be substituted for Federal 209.

C. **Wads.** Card wads and fiber wads are used for certain slug and buckshot loads and a few light shotshell loads. Do not interchange wads.

D. **Shot.** Use only clean lead shot. **DO NOT USE STEEL SHOT IN SHOTSHELL LOADS LISTED IN THIS GUIDE.**

E. **Shot Buffers.** Do not add any buffers or fillers of any kind to shotshell loads listed in this Guide.

F. **Cards and Fillers.** For revolver, pistol, and rifle cartridge reloading, do not add any cards, kapok, or fillers of any kind to loads listed in this Guide.

### Black Powder

Black powder is entirely different from smokeless powder. NEVER substitute one for the other. Smokeless powders have much more energy than black powder. NEVER attempt to use smokeless powder in black powder guns or saluting cannon; they may blow up and cause serious personal injury (including death).

# 1996 Powder Bushing Charts

A reloading scale is *required* to check the nominal weight of a powder charge.

Powder bushings can vary in the charge weight they drop and could vary as much as several grains under certain conditions.

Powder density, moisture content, and loading technique can cause a variation from the bushing weights listed on the charts. Also, the loading machine vibration affects charge weights. A complete loading cycle should be completed to *assure* an average powder charge weight.

The information in these tables has been supplied by the reloading machine manufacturers and *is not a reloading recommendation* or a result of Alliant's testing.

## Lee Powder Bushing Chart (Units shown in grains)

Bushing #	.095	.100	.105	.110	.116	.122	.128	.134	.141	.148	.151*	.155	.163	.171	.180	.189	.198
Red Dot	11.0	11.6	12.2	12.8	13.5	14.2	14.8	15.5	16.4	17.2	17.5	18.0	18.9	19.8	20.9	21.9	23.0
Green Dot	12.3	13.0	13.6	14.3	15.1	15.8	16.6	17.4	18.3	19.2	19.6	20.1	21.2	22.2	23.4	24.5	25.7
Unique	14.3	15.0	15.8	16.5	17.4	18.3	19.2	20.1	21.2	22.2	22.7	23.3	24.5	25.7	27.0	28.4	29.7
Herco	13.9	14.6	15.3	16.1	16.9	17.8	18.7	19.6	20.6	21.6	22.0	22.6	23.8	25.0	26.3	27.6	28.9
Blue Dot	18.0	19.0	19.9	20.8	22.0	23.1	24.3	25.4	26.7	28.0	28.6	29.4	30.9	32.4	34.1	35.8	37.5
2400	21.0	22.1	23.2	24.3	25.6	27.0	28.3	29.6	31.2	32.7	33.4	34.3	36.0	37.8	39.8	41.8	43.8

\*NOTE: Only available with Lee Load-Fast.

## Hornady Powder Bushing Chart for 366 Auto and Apex 91 (Units shown in grains)

Grains	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44			
Red Dot			384	393	405	423	438	453	468	480	489	498	510	519																								
American Select						417	423	432	447	456	468	477	483																									
Green Dot			363	378	390	405	420	435	447	456	468	480	492	501	513	522	534	—	549	558																		
Unique			342	354	369	381	393	405	414	423	435	444	453	465	474	483	492	501	—	510																		
Herco			357	369	381	393	405	414	426	438	450	462	471	477	489	498	—	513	522	531	—	549	558	564	573	—	588	594										
Blue Dot									366	372	381	390	396	408	414	423	435	441	447	459	468	474	483	489	495	501	510	516	522	531	534	543	549	555	561			
2400			256	266	—	291	300	312	324	330	339																											

## Ponsness/Warren Powder Bushing Chart (Units shown in grains)

Bushing #	1A	2A	3A	A	B	C	C1	D	D1	E	E1	E2	F	F1	F2	G	G1	H	I	J	J1	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA			
Bullseye										16.2	16.8	17.7	18.7	19.4																											
Red Dot										11.6	12.2	12.9	13.4	13.7	14.5	14.7	15.7	16.5	16.8	17.3	17.6	18.5	19.4	20.7	20.9	21.3	21.9	22.9													
American Select																16.4	17.5	18.2	18.8	19.4	19.9	20.6	22.0																		
Green Dot										11.7	12.3	13.1	13.6	13.8	14.7	14.9	15.9	16.7	17.0	17.5	17.9	18.8	19.6	21.1	21.3	21.8	22.3	23.2	23.6	25.3	26.5										
Unique										12.6	14.2	14.8	15.6	16.5	17.2	17.5	18.7	19.0	20.2	21.2	21.7	22.3	22.7	24.0	25.0	26.8	27.1	27.6													
Herco										12.3	13.8	14.4	15.1	16.0	16.6	16.9	18.0	18.3	19.5	20.5	20.9	21.5	21.9	23.0	24.0	25.7	26.0	26.5	27.1	28.1	28.8	30.7	32.1	33.1	34.9	35.4	37.2				
Blue Dot										16.4	18.4	19.2	20.1	21.3	22.2	22.6	23.9	24.3	25.9	27.2	27.7	28.5	29.1	30.6	31.9	34.2	34.5	35.2	36.0	37.5	38.1	40.7	42.5	43.8	46.5	47.2	49.5	55.7			
2400			12.3	13.2	15.2	16.1	16.8	17.6	18.3	19.0	21.3	22.2	23.3	24.7	25.7	26.1	27.7	28.2	30.0	31.5	32.2	33.1	33.7	35.5	37.1	39.8	40.2	41.1	42.0	43.8	44.5	47.5	49.8								

## MEC Powder Bushing Chart (Units shown in grains)

Bushing #	10	11	12	12A	13	13A	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Bullseye	8.6	9.1	9.6	10.1	10.6	11.2	11.7	12.3	12.9	13.5	14.1	14.8	15.4	16.1	16.8	17.5	18.2	18.9	19.6	20.4	21.2	21.9	22.8	23.7
Red Dot	6.3	6.7	7.1	7.5	7.9	8.3	8.7	9.2	9.6	10.1	10.6	11.1	11.6	12.1	12.6	13.1	13.7	14.2	14.9	15.7	16.4	17.1	17.8	18.5
American Select	6.9	7.3	7.7	8.2	8.6	9.1	9.6	10.1	10.6	11.1	11.7	12.2	12.8	13.3	13.9	14.5	15.1	15.7	16.4	17.0	17.7	18.3	19.0	19.7
Green Dot	6.7	7.2	7.6	8.0	8.4	8.9	9.3	9.8	10.3	10.8	11.3	11.8	12.4	12.9	13.5	14.0	14.6	15.2	15.8	16.4	17.0	17.7	18.3	19.0
Unique	7.5	7.9	8.4	8.9	9.4	9.9	10.4	10.9	11.4	12.0	12.6	13.1	13.7	14.5	15.1	15.8	16.4	17.1	17.7	18.4	19.1	19.8	20.5	21.1
Herco	7.9	8.3	8.8	9.3	9.8	10.4	10.9	11.4	12.0	12.6	13.2	13.8	14.4	15.0	15.7	16.3	17.0	17.7	18.4	19.1	19.8	20.6	21.3	22.1
Blue Dot	10.8	11.3	11.9	12.5	13.1	13.7	14.4	15.0	15.7	16.3	17.0	17.7	18.4	19.2	20.1	21.0	21.9	22.8	23.7	24.6	25.5	26.4	27.3	28.2
2400	11.8	12.5	13.3	14.0	14.8	15.6	16.4	17.2	18.1	18.9	19.8	20.7	21.7	22.6	23.6	24.6	25.6	26.6	27.7	28.8	29.9	31.0	32.1	33.3

## MEC Powder Bushing Chart continued (Units shown in grains)

Bushing #	32	33	34	35	36	37	38	38A	39	39A	40	40A	41	41A	42	42A	43	43A	44	44A	45	45A	46
Bullseye	24.6	25.5	26.4	27.3	28.2	29.1	30.1	31.0	31.9	32.8	33.7	34.7	35.7	36.9	38.1	39.4	40.7	42.0	43.3	44.6	46.0	47.4	48.8
Red Dot	19.2	19.9	20.6	21.3	21.9	22.7	23.3	24.1	24.7	25.2	25.9	26.6	27.3	27.9	28.4	29.3	29.9	30.8	31.5	32.1	32.7	33.4	34.1
American Select	20.4	21.1	21.8	22.6	23.3	24.1	24.9	25.7	26.5	27.3	28.1	28.9	29.8	30.7	31.5	32.4	33.3	34.2	35.2	36.4	37.0	38.0	39.0
Green Dot	19.6	20.3	21.0	21.7	22.4	23.2	23.9	24.7	25.4	26.2	27.0	27.8	28.6	29.4	30.3	31.1	32.0	32.8	33.7	34.6	35.5	36.4	37.4
Unique	21.7	22.5	23.2	24.0	24.8	25.6	26.5	27.3	28.2	29.0	29.9	30.8	31.7	32.6	33.5	34.5	35.4	36.4	37.4	38.4	39.4	40.4	41.4
Herco	22.9	23.7	24.5	25.3	26.2	27.0	27.9	28.8	29.7	30.6	31.5	32.4	33.4	34.3	35.3	36.3	37.3	38.3	39.3	40.4	41.4	42.5	43.6
Blue Dot	29.1	30.5	31.6	32.7	33.8	35.0	36.1	37.3	38.5	39.7	40.9	42.2	43.4	44.7	46.0	47.4	48.7	50.1	51.5	52.9	54.3	55.7	57.2
2400	34.5	35.7	36.9	38.1	39.4	40.7	42.0	43.3	44.6	46.0	47.4	48.8	50.2	51.6	53.1	54.6	56.1	57.6	59.2	60.7	62.3	63.9	65.6



## Properties and Storage of Smokeless Powder

Ammunition handloading has become increasingly popular in recent years. This information discusses properties of smokeless powder and offers recommendations for its storage.

This information is intended to increase the knowledge of all concerned individuals and groups regarding smokeless powder. The statements and recommendations made are not intended to supersede local, state, or Federal regulations. Proper authorities should be consulted on regulations for storage and use of smokeless powder in each specific community. A leaflet entitled *"Sporting Ammunition Primers: Properties, Handling, & Storage for Hand Loading"* supplements this information on smokeless powder.

### 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 nitroglycerin.

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 against 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 from 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 of 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 burn 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 (reprinted at end of leaflet).

## 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 CABINETS TO CLOSE CONFINEMENT.**

**STORAGE CABINETS SHOULD BE CONSTRUCTED OF INSULATING MATERIALS AND WITH A WEAK WALL, SEAMS OR JOINTS TO PROVIDE AN EASY MEANS OF SELF-VENTING.**

**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.

## 10-3 Smokeless Propellants.

**10-3.1** Quantities of smokeless propellants not exceeding 25 lb (11.3 kg) in shipping containers approved by the U.S. Department of Transportation, may be transported in a private vehicle.

**10-3.2** Quantities of smokeless propellants exceeding 25 lb (11.3 kg) but not exceeding 50 lb (22.7 kg), transported in a private vehicle, shall be transported in a portable magazine having wood walls of at least 1-in. (25.4-mm) nominal thickness.

**10-3.3** Transportation of more than 50 lb (22.7 kg) of smokeless propellants in a private vehicle is prohibited.

**10-3.4** Commercial shipments of smokeless propellants in quantities not exceeding 100 lb (45.4 kg) are classified for transportation purposes as flammable solids when packaged according to U.S. Department of Transportation Hazardous Materials Regulations (Title 49, Code of Federal Regulations, Part 173.197a), and shall be transported accordingly.

**10-3.5** Commercial shipments of smokeless propellants exceeding 100 lb (45.4 kg) or not packaged in accordance with the regulations cited in 10-3.4 shall be transported according to U.S. Department of Transportation regulations for Class B propellant explosives.

**10-3.6** Smokeless propellants shall be stored in shipping containers specified by U.S. Department of Transportation Hazardous Materials Regulations.

**10-3.7** Smokeless propellants intended for personal use in quantities not exceeding 20 lb (9.1 kg) may be stored in original containers in residences. Quantities exceeding 20 lb (9.1 kg), but not exceeding 50 lb (22.7 kg), may be stored in residences if kept in a wooden box or cabinet having walls of at least 1-in. (25.4-mm) nominal thickness.

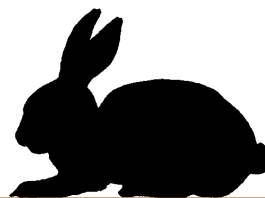
**10-3.8** Not more than 20 lb (9.1 kg) of smokeless propellants, in containers of 1-lb (0.45-kg) maximum capacity, shall be displayed in commercial establishments.

**10-3.9** Commercial stocks of smokeless propellants shall be stored as follows:

- (a) Quantities exceeding 20 lb (9.1 kg), but not exceeding 100 lb (45.4 kg), shall be stored in portable wooden boxes having walls of at least 1-in. (25.4 mm) thickness.
- (b) Quantities exceeding 100 lb (45.4 kg), but not exceeding 800 lb (363 kg), shall be stored in nonportable storage cabinets having walls of at least 1-in. (25.4-mm) thickness. Not more than 400 lb (181 kg) may be stored in any one cabinet and cabinets shall be separated by a distance of at least 25 ft. (7.63 m) or by a fire partition having a fire resistance of at least 1 hour.
- (c) Quantities exceeding 800 lb (363 kg), but not exceeding 5,000 lb (2268 kg), may be stored in a building if the following requirements are met:
  1. The warehouse or storage room shall not be accessible to unauthorized personnel.
  2. Smokeless propellant shall be stored in nonportable storage cabinets having wood walls at least 1 in. (25.4-mm) thick and having shelves with no more than 3 ft (0.92 m) separation between shelves.
  3. No more than 400 lb (181 kg) shall be stored in any one cabinet.
  4. Cabinets shall be located against walls of the storage room or warehouse with at least 40 ft (12.2 m) between cabinets.
  5. Separation between cabinets may be reduced to 20 ft. (6.1 m) if barricades twice the height of the cabinets are attached to the wall, midway between each cabinet. The barricades shall extend at least 10 ft (3 m) outward, shall be firmly attached to the wall, and shall be constructed of ¼-in. (6.4-mm) boiler plate, 2-in. (51-mm) thick wood, brick, or concrete block.
  6. Smokeless propellant shall be separated from materials classified by the U.S. Department of Transportation as flammable liquids, flammable solids, and oxidizing materials by a distance of 25 ft (7.63 m) or by a fire partition having a fire resistance of at least 1 hour.
  7. The building shall be protected by an automatic sprinkler system installed according to NFPA 13, Standard for the Installation of Sprinkler Systems.
- (d) Smokeless propellants not stored according to (a), (b) and (c) above shall be stored in a Type 4 magazine constructed and located according to Chapter 6.

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# Silhouette Loads



Cartridge/Bullet	Primer	Min OAL (inches)	Blue Dot			2400			Reloder 7		
			Charge Weight (grams)	Velocity (fps)	Chamber Pressure (copper units)	Charge Weight (grams)	Velocity (fps)	Chamber Pressure (copper units)	Charge Weight (grams)	Velocity (fps)	Chamber Pressure (copper units)
<b>.222 Remington (Rem. case)</b>											
50 gr. Sierra Spitzer	Fed. 205M	2.090				12.9	2,425	43,800	19.3	2,700	43,800
53 gr. Sierra BRHP		2.104				12.4	2,345	43,800	18.2	2,575	43,500
55 gr. Sierra Spitzer		2.125				12.0	2,250	43,100	17.6	2,495	43,400
60 gr. Hornady Spire Pt.		2.125				12.0	2,180	43,800	17.0	2,400	43,800
68.0 gr. Hornady BTHP		2.125				11.3	1,990	43,800	16.5	2,230	43,200
<b>.223 Remington (Rem. case)</b>											
55 gr. Sierra Spitzer	Fed. 205M	2.250				15.9	2,430	48,500	22.1	2,670	48,900
60 gr. Hornady Spire Pt.		2.250				15.4	2,320	48,500	21.4	2,550	49,500
70 gr. Hornady Spire Pt.		2.250				13.0	1,965	48,600	17.0	2,180	48,800
<b>7mm BR Rem. (Rem. case)</b>											
120 gr. Sierra Spitzer	Rem. 7½ BR	2.300				20.2	2,160	47,100	27.8	2,425	47,400
145 gr. Speer Spitzer		2.300				17.7	1,800	47,200	24.8	2,130	47,800
<b>7mm/08 (Rem. case)</b>											
120 gr. Sierra Spitzer	Fed. 210 BR	2.750				27.5	2,310	48,100	37.2	2,560	48,900
145 gr. Speer Spitzer		2.750				23.5	1,970	48,300	33.0	2,250	48,300
<b>.30-.30 Winchester (Fed. case)</b>											
152 gr. Cast Lead	Fed. LR #210	2.500	13.0	1,525	29,000	16.0	1,650	33,300	25.0	1,950	34,900
170 gr. Rem. SPCL		2.500				16.0	1,500	34,700	23.5	1,800	34,900
<b>.35 Remington (Rem. case)</b>											
158 gr. Hornady L	Fed. LR #210	2.400	15.5	1,574	25,200	21.0	1,715	25,300	28.5	1,875	26,600
170 gr. Sierra FMJ		2.400	13.0	1,300	22,400	17.0	1,450	23,400			
200 gr. Rem. SPCL		2.510				22.0	1,650	31,700	30.0	1,825	31,700
<b>.357 Magnum (Win. case)</b>											
158 gr. Rem. SP	Fed. 200	1.580	12.0	1,600	42,900	14.6	1,640	42,300			
170 gr. Sierra FMJ		1.580	10.7	1,445	41,700	13.2	1,450	43,000			
180 gr. Speer FMJ		1.580	9.6	1,265	42,300	11.8	1,320	42,900			
180 gr. Sierra FPJ		1.580	9.2	1,250	42,400	12.1	1,350	41,700			
<b>.357 Maximum (Rem. case)</b>											
125 gr. Speer JHP	Rem. 7½ BR	1.900	15.0	1,860	38,200	20.5	2,045	38,200			
158 gr. Hornady HP		1.975				18.0	1,790	40,400	26.0	1,845	33,600
160 gr. Speer SP		1.975	15.3	1,760	40,700	17.4	1,775	41,200	26.0	1,830	32,700
170 gr. Sierra FMJ		1.975	14.5	1,675	41,300	16.5	1,670	40,500	25.5	1,840	40,100
180 gr. Sierra FPJ		1.975	14.9	1,610	39,400	16.8	1,590	39,000	25.0	1,760	39,700
200 gr. Speer FMJ		1.975	11.6	1,275	41,300	14.1	1,340	41,300	22.3	1,650	41,400
<b>.44 Rem. Magnum (Rem. case)</b>											
180 gr. Sierra HC	Fed. 150	1.590	18.8	1,875	37,900	23.0	1,910	37,800			
240 gr. Speer FMJ		1.590	15.5	1,550	37,600	18.8	1,560	36,800			
250 gr. Sierra FPJ		1.590	15.0	1,525	36,800	19.0	1,600	37,800			
265 gr. Hornady FP		1.590	14.1	1,420	36,300	17.4	1,460	37,400			

Test barrels were 14 inches long, except .357 Maximum, which was 12½ inches.

See NOTES and KEY on page 55.

See Special Reloading Precautions on page 56.

# Centerfire Rifle



Cartridge/Bullet	Primer	Min. OAL (inches)	Case	Bbl Length	2400			Reloder 7			Reloder 12			Reloder 15			Reloder 19			Reloder 22		
					Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi
<b>.17 Rem.</b> Hornady 25HP	Rem. 7½	2.140	Rem.	24							21.8	3,750	c.u.p. 50,100	22.8	3,915	c.u.p. 50,200						
<b>.22 Hornet</b> Speer 40SP	Win. 6½-116	1.710	Win.	24	7.5	2,250	c.u.p. 41,000	11.0	2,265	c.u.p. 19,800												
Speer 45 Spitz		1.710		24	7.1	2,065	c.u.p. 41,300	10.6	2,170	c.u.p. 20,300												
Hornady 50SPSX		1.710		24	7.0	1,945	c.u.p. 41,700	10.5	2,115	c.u.p. 21,500												
<b>.22/250 Rem.</b> Speer 45 Spitz	Win. 8½-120	2.300	Win.	24							35.5	3,760	59,400									
Hornady 50SPSX		2.350		24							34.3	3,575	58,900									
Hornady 55SPSX		2.350		24							33.3	3,425	59,200	35.3	3,625	59,400						
Hornady 60SP		2.350		24							32.5	3,290	58,500	34.7	3,485	59,400	41.0	3,510	57,800			
<b>.220 Swift</b> Speer 45 Spitz	CCI 200	2.645	Horn.	24							36.6	3,760	c.u.p. 50,100	39.0	4,010	c.u.p. 50,300						
Hornady 50SPSX		2.660		24							36.1	3,675	c.u.p. 50,500	38.6	3,850	c.u.p. 49,800	44.0	3,650	c.u.p. 50,400			
Hornady 55MJB		2.630		24										38.0	3,775	c.u.p. 50,500	43.9	3,610	c.u.p. 50,500			
Hornady 60 Sp. Pt.		2.680		24										35.8	3,540	c.u.p. 50,400	43.0	3,575	c.u.p. 50,400	43.0	3,565	c.u.p. 49,900
<b>.221 Rem. Fireball</b> Speer 40SP	Rem. 7½	1.800	Rem.	10½	15.5	2,700	c.u.p. 46,500															
Sierra 50 Spitz		1.825		10½	13.8	2,410	c.u.p. 43,500															
Sierra 53BRHP		1.825		10½	13.5	2,320	c.u.p. 43,600															
Nosler 60 Spitz		1.825		10½	13.3	2,200	c.u.p. 46,300	18.1	2,250	c.u.p. 34,000												
<b>.222 Rem.</b> Speer 45 Spitz	Rem. 7½ BR	2.090	Rem.	24				19.8	3,225	47,500	25.0	3,290	46,200									
Sierra 50SMP		2.130		24				20.0	3,115	47,400	24.0	3,120	44,300									
Sierra 55FMBT		2.130		24							24.0	3,190	47,900	24.3	3,120	47,900						
Hornady 60SPPT		2.130		24										22.5	2,915	47,500						
<b>.222 Rem. Mag.</b> Speer 45 Spitz	Rem. 7½	2.280	Rem.	24				23.0	3,400	c.u.p. 46,500												
Sierra 50 Spitz		2.280		24				22.5	3,250	c.u.p. 45,400												
Sierra 53BRHP		2.280		24				22.0	3,120	c.u.p. 44,500												
Sierra 55 Spitz		2.280		24				22.0	3,100	c.u.p. 46,000												

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Cartridge/Bullet/Primer	Min. OAL (inches)	Case	Bbl Length	2400			Reloder 7			Reloder 12			Reloder 15			Reloder 19			Reloder 22			
				Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	
<b>.223 Rem.</b>																						
Speer 45 Spitz	Fed. 205M	2.210	Fed.	24	14.9	3,030	49,600	21.8	3,375	53,200	28.0	3,470	52,800	28.5	3,635	53,500						
Hornady 50SP		2.250		24	14.5	2,795	48,500	21.5	3,195	53,000	27.0	3,335	52,300									
Sierra 52HPBT		2.250		24				20.9	3,165	53,300	27.5	3,310	52,700	28.3	3,440	53,100						
Hornady 55MJBT		2.215		24	14.0	2,685	49,900	20.5	3,080	52,400	27.5	3,255	52,200	28.0	3,390	53,600						
Hornady 60 Sp. Pt.		2.250		24							25.5	3,070	53,300	26.5	3,240	53,000						
Hornady 68BTHP		2.260		24							24.0	2,935	56,600	25.6	3,030	52,800						
Hornady 75BTHP	Rem.	2.260	Rem.	24										24.9	2,895	53,400						
Sierra 80HPBT	Rem.	2.260	Rem.	24										24.0	2,800	53,000						
<b>.225 Win.</b>																						
Win. 50PSP	Win. 8½-120	2.450	Win.	24				22.0	3,130	c.u.p. 44,000												
Win. 55PSP		2.450		24				22.0	3,075	c.u.p. 44,500												
<b>.243 Win.</b>																						
Sierra 60HP	Win. 8½-120	2.550	Win.	24				30.2	3,320	54,800	38.5	3,450	56,400									
Speer 75HP		2.610		24							34.0	3,125	57,500									
Speer 80 Spitz		2.685		24							34.0	3,060	57,000	36.5	3,145	57,500	44.5	3,270	57,500			
Sierra 100 Spitz BT		2.700		24													41.0	2,925	57,100	41.7	2,950	57,500
<b>6mm Remington</b>																						
Sierra 60HP	Rem. 9½	2.760	Rem.	24							41.8	3,665	62,800	43.6	3,820	62,700						
Speer 75HP		2.790		24							39.0	3,340	62,200	40.6	3,410	62,300						
Speer 80 Spitz		2.790		24							38.0	3,205	62,300	40.5	3,340	63,000	49.5	3,435	61,700	51.5	3,450	60,900
Sierra 100 Spitz BT		2.800		24													46.0	3,145	62,500	48.0	3,205	62,500
<b>.25-06 Rem.</b>																						
Sierra 75HP	Fed. 210	3.090	Fed.	24							48.0	3,580	59,900									
Speer 87 Spitz		3.090		24							44.5	3,290	59,500	47.2	3,425	61,000	57.3	3,525	59,800			
Speer 100 Spitz		3.200		24										44.9	3,190	61,000	54.3	3,320	61,000	55.9	3,355	61,100
Sierra 120HPBT		3.225		24													50.5	3,025	60,400	52.5	3,080	60,400
<b>.25/20 Win.</b>																						
Rem. 86SP	CCI 400	1.590	Rem.	24	8.0	1,340	c.u.p. 18,300	11.5	1,460	c.u.p. 15,000												
<b>.250 Savage</b>																						
Sierra 75HP	Rem. 9½	2.400	Rem.	24							37.8	3,250	c.u.p. 43,800	38.3	3,350	c.u.p. 43,700						
Speer 87 Spitz		2.450		24										36.0	3,135	c.u.p. 43,800	41.0	2,940	c.u.p. 42,800			
Speer 100 Spitz		2.500		24													40.0	2,855	c.u.p. 43,400			
Sierra 120HPBT		2.510		24																40.0	2,680	c.u.p. 43,600
<b>.257 Roberts</b>																						
Sierra 75HP	Win. 8½-120	2.775	Win.	24							39.0	3,160	c.u.p. 42,800	41.8	3,340	c.u.p. 42,700						
Speer 87 Spitz		2.775		24							36.5	2,930	c.u.p. 43,300	41.0	3,185	c.u.p. 43,200						
Speer 100 Spitz		2.775		24													44.7	2,930	c.u.p. 43,100			
Sierra 120HPBT		2.775		24																44.0	2,785	c.u.p. 43,000
<b>.257 Roberts+P</b>																						
Sierra 75HP	Win. 8½-120	2.775	Win.	24							41.0	3,365	c.u.p. 48,000	43.4	3,510	c.u.p. 48,000						
Speer 87 Spitz		2.775		24							39.5	3,165	c.u.p. 48,000	43.5	3,310	c.u.p. 48,000						
Speer 100 Spitz		2.775		24													47.2	3,110	c.u.p. 47,900			
Sierra 120 HPBT		2.775		24																46.5	2,945	c.u.p. 48,000

# Centerfire Rifle (continued)

Cartridge/Bullet	Primer	Min. OAL (inches)	Case	Bbl Length	2400			Reloder 7			Reloder 12			Reloder 15			Reloder 19			Reloder 22					
					Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi			
<b>257 Wby. Mag.</b>																									
Sierra 75HP	Fed. 215	3.075	Wby.	26													73.3	3,895	52,900	77.0	3,900	53,000			
Speer 87 Spitz		3.150		26													68.4	3,650	53,000	73.0	3,675	52,700			
Speer 100 Spitz		3.170		26													64.5	3,420	52,700	69.0	3,460	52,400			
Barnes 115 Spitz		3.170		26													61.3	3,175	53,000	64.5	3,200	52,700			
Nosler 120 SP		3.170		26													59.7	3,100	53,000	62.7	3,140	52,900			
<b>6.5x55 Swedish Mauser</b>																									
Hornady 129SP	CCI 200	2.935	Norma	24				25.8	2,130	c.u.p. 43,600				36.7	2,465	c.u.p. 44,400				48.0	2,815	c.u.p. 44,500			
Speer 140 Spitz		3.000		24										35.0	2,395	c.u.p. 44,500				46.0	2,650	c.u.p. 44,000	48.1	2,700	c.u.p. 44,400
Hornady 160RN		2.975		24				25.0	1,940	c.u.p. 44,000				35.2	2,225	c.u.p. 44,200				45.0	2,500	c.u.p. 44,300	47.0	2,535	c.u.p. 44,000
<b>.264 Win. Mag.</b>																									
Hornady 129 Sp. Pt.	Win. 8½-120	3.270	Win.	24																57.0	3,070	c.u.p. 51,800			
Speer 140 Spitz		3.340		24																56.0	2,945	c.u.p. 51,800	57.0	2,960	c.u.p. 51,300
Hornady 160RN		3.315		24																57.0	2,780	c.u.p. 51,800			
<b>.270 Win.</b>																									
Speer 100 Spitz	Win. 8½-120	3.150	Win.	24										53.8	3,465	c.u.p. 62,000				64.0	3,510	c.u.p. 61,800			
Speer 130 Spitz		3.250		24										47.3	2,840	c.u.p. 61,600				57.5	3,110	c.u.p. 61,600	60.0	3,160	c.u.p. 61,500
Sierra 140SBT		3.280		24										47.0	2,770	c.u.p. 61,600				57.0	2,910	c.u.p. 61,500	60.0	2,930	c.u.p. 59,400
Sierra 150 Spitz BT		3.320		24																55.5	2,945	c.u.p. 61,400	58.5	3,010	c.u.p. 61,800
Nosler 150 Spitz		3.325		24																56.5	2,810	c.u.p. 61,800	59.5	2,845	c.u.p. 60,300
<b>.270 Wby. Mag.</b>																									
Speer 100 Spitz	Fed. 215	3.160	Wby.	26																76.8	3,755	c.u.p. 53,400	79.0	3,775	c.u.p. 53,000
Speer 130 Spitz		3.260		26																70.5	3,340	c.u.p. 53,500	73.8	3,400	c.u.p. 53,500
Sierra 140 SBT		3.275		26																68.1	3,240	c.u.p. 53,500	71.0	3,280	c.u.p. 53,500
Sierra 150 SBT		3.285		26																64.4	3,075	c.u.p. 53,500	68.8	3,145	c.u.p. 53,500
Nosler 150 Spitz		3.285		26																64.8	3,090	c.u.p. 53,200	69.7	3,180	c.u.p. 53,500
<b>7-30 Waters</b>																									
Hornady 120 Sp. Pt.	Fed. 210	2.640	Fed.	24				27.3	2,470	c.u.p. 38,600				36.5	2,645	c.u.p. 38,700				36.3	2,725	c.u.p. 39,000			
Hornady 139 F.P.		2.650		24										33.8	2,405	c.u.p. 39,000				34.7	2,540	c.u.p. 38,800			
<b>7mm-08 Rem.</b>																									
Hornady 120 Sp. Pt.	Rem. 9½	2.750	Rem.	24				35.5	2,775	c.u.p. 57,200				45.2	2,950	c.u.p. 58,400				45.5	3,070	c.u.p. 58,700			
Hornady 139 Sp. Pt.		2.800		24				34.0	2,555	c.u.p. 57,300				42.5	2,735	c.u.p. 59,000				43.0	2,830	c.u.p. 59,000	52.0	2,850	c.u.p. 57,900
Speer 145 Spitz		2.800		24				31.8	2,405	c.u.p. 57,500				39.6	2,580	c.u.p. 59,000				41.0	2,700	c.u.p. 59,000	49.3	2,785	c.u.p. 58,900
Sierra 150 HPBT		2.800		24				32.3	2,410	c.u.p. 57,300				40.1	2,590	c.u.p. 58,500				40.9	2,685	c.u.p. 58,600	49.0	2,760	c.u.p. 58,700
Sierra 160 Spitz BT		2.800		24										40.0	2,535	c.u.p. 58,900				40.5	2,620	c.u.p. 59,000	48.5	2,675	c.u.p. 56,400

Cartridge/Bullet	Primer	Min. OAL (inches)	Case	Bbl Length	2400			Reloder 7			Reloder 12			Reloder 15			Reloder 19			Reloder 22		
					Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi
<b>7x57 Mauser</b>																						
Hornady 120 Sp. Pt.	Fed. 210	2.965	Fed.	24							43.0	2,895	48,900	45.0	2,995	48,900	54.0	3,030	48,000			
Hornady 139 Sp. Pt.		3.015		24							40.5	2,660	48,800	41.5	2,700	48,400	51.8	2,835	49,000	53.0	2,790	45,600
Speer 145 Spitz		3.040		24							37.0	2,520	48,800	38.5	2,550	48,500	47.3	2,680	48,800	48.8	2,720	49,000
Sierra 160 Spitz BT		3.040		24													49.0	2,665	45,500	50.0	2,690	48,300
<b>.280 Rem.</b>																						
Hornady 120SP	Rem. 9½	3.310	Rem.	24							47.1	2,985	57,900	48.0	3,065	57,200	58.0	3,115	57,600			
Hornady 139 Sp. Pt.		3.320		24							44.0	2,700	57,100	46.5	2,860	57,700	57.0	2,970	58,000	59.5	3,000	57,500
Speer 145 Spitz		3.320		24							42.5	2,580	57,600	43.0	2,630	57,100	53.0	2,815	57,800	56.0	2,865	58,000
Sierra 160 Spitz BT		3.325		24													53.4	2,750	58,100	55.7	2,795	58,000
<b>.284 Win.</b>																						
Hornady 120 SP	Win. LR	2.800	Win.	24										51.5	3,235	54,300	60.5	3,265	53,600			
Hornady 139SP	8½-120	2.795		24										48.0	2,975	54,700	57.0	3,075	53,500	58.5	3,030	49,000
Speer 145 Spitz		2.795		24										46.7	2,855	55,100	55.0	2,940	52,400	55.0	2,900	49,200
Nosler 150 Part.		2.790		24													55.0	2,940	53,500	55.0	2,840	46,300
Sierra 160 Spitz BT		2.800		24													54.0	2,885	54,600	52.0	2,680	42,700
<b>7mm Rem. Mag</b>																						
Hornady 120 Sp. Pt.	Rem. 9½	3.275	Fed.	24							54.0	3,110	59,000	55.0	3,200	58,300	69.0	3,465	58,600	73.0	3,490	58,600
Hornady 139 Sp. Pt.		3.275		24							57.0	3,035	59,000	55.6	3,070	59,000	67.5	3,260	58,100	70.0	3,295	58,000
Speer 145 Spitz		3.280		24							48.0	2,765	58,900	47.5	2,780	58,700	61.7	3,090	58,400	64.5	3,150	58,600
Sierra 160 Spitz BT		3.285		24													62.0	3,020	58,500	65.0	3,075	58,600
Sierra 175 Spitz BT		3.285		24																61.3	2,900	58,400
<b>7mm Wby. Mag.</b>																						
Hornady 120 Sp. Pt.	Fed. 215	3.200	Wby.	26										61.3	3,370	c.u.p. 52,500		c.u.p. 52,100				
Hornady 139 Sp. Pt.		3.280		26													74.0	3,505	52,100			c.u.p.
																				74.8	3,355	c.u.p. 52,300
Speer 145 Spitz		3.240		26													70.9	3,315	52,500			c.u.p.
Nosler 150 Spitz		3.250		26																72.4	3,245	c.u.p. 52,500
Sierra 160 Spitz		3.240		26																72.0	3,220	c.u.p. 52,400
Sierra 175 Spitz		3.245		26																70.7	3,110	c.u.p. 52,500
<b>.30 Carbine</b>																						
Hornady 100SJ	CCI 400	1.625	Fed.	20	12.3	1,815	c.u.p. 34,500															
Cast (GC) 112L		1.625		20	10.3	1,590	c.u.p. 35,700															
<b>.30-06 Springfield</b>																						
Sierra 110JHP	Fed. 210	3.100	Fed.	24	30.9	2,715	55,900	45.0	3,145	56,400	57.0	3,280	58,300	58.6	3,465	58,100						
Sierra 125 Spitz		3.120		24	30.0	2,575	55,100	42.0	2,915	56,600	55.3	3,170	58,300	56.8	3,275	58,500	65.5	2,995	47,300			
Hornady 150 Sp. Pt.		3.210		24	29.4	2,330	56,000	43.8	2,780	57,000	53.6	2,960	58,400	53.6	3,005	58,500	63.5	2,895	50,900	63.0	2,815	46,000
Barnes X 150		3.220		24										50.6	2,910	58,500	63.0	2,950	56,400	62.0	2,845	50,600
Nosler 165 Part.		3.220		24										49.8	2,815	58,500	62.1	2,890	58,500	60.0	2,755	51,300
Speer 165 Spitz		3.250		24	29.2	2,295	55,400	40.5	2,610	56,800	51.1	2,785	57,900	50.5	2,835	58,500	62.0	2,880	56,100	62.0	2,824	52,500
Speer 180 Spitz		3.250		24	28.2	2,210	55,400	39.8	2,505	56,900	49.6	2,695	58,500	48.5	2,720	58,200	60.0	2,800	57,000	60.0	2,710	51,000
Nosler 180 Part.		3.250		24										48.3	2,660	58,500	60.0	2,750	57,100	60.0	2,675	51,500
Win. 180 F.S.	Win. W.L.R.	3.200	Win.	24							45.3	2,515	56,800	47.0	2,600	56,500	57.2	2,685	55,300	59.0	2,670	52,000
Sierra 190 MKing	Fed. 210	3.300	Fed.	24	26.0	2,075	55,600	37.4	2,340	57,400	46.0	2,520	58,300	47.3	2,600	58,500	58.0	2,720	58,100	60.0	2,755	56,600
Sierra 200 Spitz BT		3.300		24							44.8	2,440	58,300	46.0	2,505	58,500	55.8	2,630	58,500	58.4	2,680	58,400

# Centerfire Rifle (continued)

Cartridge/Bullet	Primer	Min. OAL (inches)	Case	Bbl Length	2400			Reloder 7			Reloder 12			Reloder 15			Reloder 19			Reloder 22				
					Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi		
<b>.30-30 Win.</b>																								
Sierra 125JFP	Win. 8½-120	2.470	Win.	24				30.0	2,630	c.u.p. 34,100	37.0	2,555	39,900											
Sierra 150JFP		2.525		24				27.5	2,190	c.u.p. 33,800	33.5	2,320	40,400	36.0	2,450	40,600								
Hornady 170JFP		2.545		24				24.0	1,910	c.u.p. 34,500	32.0	2,160	40,100	34.1	2,330	40,500								
<b>.300 Savage</b>																								
Sierra 125SPT	Rem. 9½	2.600	Rem.	24							46.0	2,920	c.u.p. 44,300											
Sierra 150SPT		2.600		24							43.0	2,635	c.u.p. 41,400											
Sierra 165SBT		2.600		24							41.0	2,485	c.u.p. 40,800											
<b>.300 H&amp;H Mag.</b>																								
Hornady 150 Sp. Pt.	Fed. 210	3.570	Fed.	24									c.u.p. 52,500	63.8	3,270	52,500	75.0	3,275	c.u.p. 52,500					
Speer 165 Spitz		3.555		24									c.u.p. 52,500	60.9	3,065	52,500	72.7	3,150	c.u.p. 52,500					
Nosler 180 Part.		3.535		24									c.u.p. 52,300	58.0	2,910	52,300	70.3	3,040	c.u.p. 52,500	71.0	3,040	c.u.p. 52,100		
Speer 180 Spitz		3.575		24									c.u.p. 52,400	56.7	2,850	52,400	69.8	3,055	c.u.p. 52,500	71.5	3,070	c.u.p. 52,000		
Sierra 200 Spitz BT		3.590		24									c.u.p. 52,100	55.0	2,725	52,100	67.0	2,910	c.u.p. 52,100	69.0	2,935	c.u.p. 52,200		
<b>.300 Win. Mag</b>																								
Hornady 150 Sp. Pt.	Win. 8½-120	3.340	Win.	24							59.0	3,105	61,200	65.3	3,180	61,000	76.7	3,225	61,000	81.5	3,275	60,400		
Speer 165 Spitz		3.340		24							62.0	2,935	60,600	62.6	2,980	60,100	74.6	3,070	60,400	79.4	3,135	60,800		
Speer 180 Spitz		3.340		24															72.3	2,990	61,000	76.9	3,030	60,300
Win. 180 F.S.	Win. W.L.R.	3.340		24															72.3	2,850	55,700	76.0	2,870	54,500
Sierra 200 Spitz BT	Win. 8½-120	3.340		24															68.0	2,810	60,300	73.4	2,875	60,300
<b>.300 Wby. Mag.</b>																								
Hornady 150 Sp. Pt.	Fed. 215	3.540	Wby.	26									c.u.p. 52,800	69.5	3,255	52,800	82.5	3,375	c.u.p. 52,500	88.0	3,460	c.u.p. 53,300		
Speer 165 Spitz		3.510		26									c.u.p. 52,800	65.0	3,060	52,800	80.5	3,250	c.u.p. 53,200	85.0	3,305	c.u.p. 53,400		
Speer 180 Spitz		3.515		26									c.u.p. 53,000						78.0	3,120	53,000	82.5	3,195	c.u.p. 53,400
Nosler 180 Part.		3.530		26									c.u.p. 53,400						76.5	3,070	53,400	80.0	3,115	c.u.p. 53,300
Sierra 200 Spitz		3.550		26									c.u.p. 53,300						74.0	2,955	53,300	78.0	2,970	c.u.p. 53,000
<b>.303 British</b>																								
Hornady 123SP	Win. 8½-120	2.860	Win.	24				38.6	2,750	c.u.p. 43,200	48.0	2,915	c.u.p. 43,000	49.8	3,015	c.u.p. 43,200								
Speer 150 Spitz		2.935		24				31.0	2,400	c.u.p. 41,200	45.0	2,700	c.u.p. 42,900	46.2	2,755	c.u.p. 43,200								
Speer 180 RN		2.940		24				30.0	2,050	c.u.p. 39,600	40.0	2,340	c.u.p. 42,600	43.7	2,515	c.u.p. 43,200	50.0	2,415	c.u.p. 39,800					

Cartridge/Bullet	Primer	Min. OAL (inches)	Case	Bbl Length	2400			Reloder 7			Reloder 12			Reloder 15			Reloder 19			Reloder 22		
					Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi
<b>7.62 x 39</b>							c.u.p. 44,900															
Speer 100 Plinker	CCI 200	1.830	Fed.	20	16.5	2,240																
Sierra 110HP		2.055		20	16.0	2,115	44,800	26.5	2,330	38,300												
Hornady 123SP		2.155		20	15.3	1,915	44,900	25.5	2,330	45,000												
Sierra 150JP		2.000		20	14.8	1,800	45,000	24.8	2,145	44,600												
<b>.308 Win.</b>																						
Sierra 110JHP	Fed. 210	2.600	Fed.	24				42.5	3,130	47,200	50.5	3,200	57,400									
Sierra 125 Spitz		2.700		24				40.0	2,920	47,100	49.0	3,040	57,400									
Sierra 150 Spitz		2.600		24	25.0	2,215	c.u.p. 36,700	37.0	2,750	46,900	45.0	2,755	57,100	46.3	2,880	57,300						
Barnes 150X		2.750		24							45.8	2,750	57,400	45.0	2,815	56,800						
Barnes 165X		2.750		24							43.5	2,590	57,200	43.5	2,675	57,000						
Sierra 165 Spitz		2.700		24							44.0	2,650	57,200	45.5	2,780	57,000						
Sierra 168HPBT	Fed. 210M	2.700	Fed.	24							43.0	2,605	57,200	42.8	2,665	56,600						
Speer 180 Spitz	Fed. 210	2.750	Fed.	24										44.0	2,645	57,500						
Win. 180 F.S.	Win. W.L.R.	2.750	Win.	24							36.0	2,290	55,400	41.5	2,500	57,000						
<b>8mm Mauser</b>																						
Hornady 125SP	Win. 8½-120	2.820	Win.	24							45.0	2,720	c.u.p. 35,500	46.8	2,760	c.u.p. 36,000						
Speer 150 Spitz		2.975		24							43.0	2,455	c.u.p. 34,900	44.0	2,560	c.u.p. 36,000						
Speer 170 Spitz		3.015		24							40.0	2,280	c.u.p. 35,300	41.4	2,400	c.u.p. 36,000						
<b>8mm Rem. Mag.</b>																						
Speer 170S Spitz	Rem. 9½M	3.500	Rem.	24													82.8	3,315	61,700	87.2	3,350	61,700
Speer 200 Spitz		3.525		24													77.7	3,050	61,600	81.0	3,090	61,600
Hornady 220 Sp. Pt.		3.600		24													75.0	2,885	61,600	77.0	2,910	61,300
<b>.348 Win.</b>																						
Rem. 150SP	Rem. 9½	2.790	Rem.	24				48.0	2,750	34,900												
Rem. 200SP		2.790		24				45.0	2,330	35,800												
<b>.338 Win. Mag.</b>																						
Hornady 200 Sp. Pt.	Win. 8½-120	3.340	Win.	24									65.0	2,935	c.u.p. 51,300	78.0	3,020	c.u.p. 52,400	78.0	2,875	c.u.p. 43,200	
Nosler 210 Spitz		3.330		24													74.0	2,910	c.u.p. 52,000	76.0	2,840	c.u.p. 46,200
Hornady 225 Sp. Pt.		3.325		24									61.8	2,705	c.u.p. 51,600	75.3	2,865	c.u.p. 52,100	77.0	2,790	c.u.p. 46,200	
Barnes 225X		3.335		24									56.5	2,590	c.u.p. 51,600	72.0	2,765	c.u.p. 50,900	73.0	2,705	c.u.p. 46,900	
Win. 230 F.S.	Win. W.L.R.	3.335		24													72.0	2,790	p.s.i. 60,500	73.0	2,760	p.s.i. 56,400
Hornady 250RN	Win. 8½-120	3.330		24													73.0	2,735	c.u.p. 52,300	73.0	2,620	c.u.p. 45,300
<b>.340 Wby. Mag.</b>																						
Hornady 200 Sp. Pt.	Fed. 215	3.660	Wby.	26									71.8	2,990	c.u.p. 53,100	85.0	3,095	c.u.p. 53,300	91.0	3,170	c.u.p. 53,200	
Nosler 210 Spitz		3.595		26									70.8	2,930	c.u.p. 53,500	84.3	3,075	c.u.p. 53,500	89.2	3,135	c.u.p. 53,500	
Hornady 225 Sp. Pt.		3.645		26													83.7	2,995	c.u.p. 53,500	88.0	3,035	c.u.p. 53,400
Hornady 250RN		3.665		26													80.7	2,865	c.u.p. 53,500	84.7	2,880	c.u.p. 53,300



# Centerfire Rifle (continued)

Cartridge/Bullet	Primer	Min. OAL (inches)	Case	Bbl Length	2400			Reloder 7			Reloder 12			Reloder 15			Reloder 19			Reloder 22		
					Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi
<b>.35 Rem.</b>																						
Rem. 150SPCL	Win. 8½-120	2.485	Win.	24				32.0	2,290	c.u.p. 30,700												
Cast (GC) 158L		2.485		24				28.0	2,200	c.u.p. 29,800												
Rem. 200SPCL		2.485		24				31.0	2,115	c.u.p. 30,700												
<b>.350 Rem. Mag.</b>																						
Rem. 150SPCL	Rem. 9½M	2.800	Rem.	20				55.0	3,075	c.u.p. 47,500												
Rem. 200SPCL		2.800		20				48.0	2,550	c.u.p. 48,500												
Rem. 250PSP		2.800		20				43.0	2,230	c.u.p. 49,300												
<b>.358 Win.</b>																						
Rem. 200PSP	Win. 8½-120	2.780	Win.	24				38.0	2,420	c.u.p. 46,100	50.0	2,455	c.u.p. 44,100									
Win. 250ST		2.780		24				34.5	2,075	c.u.p. 44,700												
<b>.35 Whelen</b>																						
Hornady 200SP	Rem. 9½M	3.125	Rem.	24				51.5	2,630	c.u.p. 50,300	60.0	2,590	c.u.p. 43,200	60.0	2,675	c.u.p. 44,800						
Hornady 250RN		3.225		24				47.6	2,330	c.u.p. 50,400	60.0	2,505	c.u.p. 49,700	59.5	2,550	c.u.p. 48,400						
<b>.375 Win.</b>																						
Hornady 220FP	Win. 8½-120	2.555	Win.	24	23.5	1,900	c.u.p. 44,000	36.0	2,260	c.u.p. 45,500												
<b>.375 H&amp;H Mag.</b>																						
Hornady 220FP	Rem. 9½M	3.360	Rem.	24							75.0	2,835	c.u.p. 49,500	77.0	2,980	c.u.p. 50,000						
Hornady 270SP		3.545		24							73.5	2,540	c.u.p. 49,700	73.4	2,685	c.u.p. 49,500						
Hornady 300MC		3.550		24										66.5	2,455	c.u.p. 49,600	79.0	2,540	c.u.p. 49,600			
<b>.378 Wby. Mag.</b>																						
Hornady 270SP	Fed. 215	3.620	Wby.	26										90.5	2,940	c.u.p. 53,300	110.8	3,110	c.u.p. 53,100	115.0	3,050	c.u.p. 47,200
Barnes 300 Solid		3.625		26													108.6	2,960	c.u.p. 53,300	114.0	2,965	c.u.p. 51,600
<b>.38/55 Win.</b>																						
IVI 255SP	CCI 200	2.530	IVI	24	18.0	1,410	c.u.p. 23,500	26.5	1,725	c.u.p. 26,000												
<b>.38/40 Win.</b>																						
150 Sierra JHP	Rem. 2½	1.585	Rem.	24	14.1	1,425	c.u.p. 13,100															
180 Sierra JHP		1.585		24	13.0	1,305	c.u.p. 13,400	25.8	1,745	c.u.p. 13,500												
200 Hornady FMJ/FP		1.585		24	12.7	1,225	c.u.p. 13,500	24.0	1,610	c.u.p. 13,400												
<b>.416 Rem. Mag</b>																						
Barnes 300X	Rem. 9½M	3.600	Rem.	24							90.0	2,790	c.u.p. 52,100	90.5	2,890	c.u.p. 52,400						
Barnes 350X		3.600		24							85.0	2,525	c.u.p. 52,400	85.0	2,610	c.u.p. 52,400						
Hornady 400RN		3.565		24							82.0	2,390	c.u.p. 52,000	82.0	2,445	c.u.p. 51,700	83.0	2,140	c.u.p. 35,600			
A Square 400 Solid		3.600		24							81.0	2,410	c.u.p. 52,400	81.0	2,455	c.u.p. 50,900	82.0	2,130	c.u.p. 35,600			

Cartridge/Bullet	Primer	Min. OAL (inches)	Case	Bbl Length	2400			Reloder 7			Reloder 12			Reloder 15			Reloder 19			Reloder 22		
					Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi	Chg Wt	fps	psi
<b>.416 Rigby</b> Barnes 300X	Fed. 215	3.650	Fed.	24															103.0	2,590	c.u.p. 40,000	
Barnes 350X		3.675		24															101.0	2,455	c.u.p. 40,300	
Hornady 400RN		3.725		24															96.0	2,355	c.u.p. 39,800	
A Square 400 Solid		3.725		24															96.0	2,360	c.u.p. 40,300	
<b>.416 Wby. Mag.</b> Barnes 325X	Fed. 215	3.650	Wby.	26															117.0	2,880	c.u.p. 51,000	
Barnes 350X		3.650		26															116.9	2,830	c.u.p. 51,000	
Hornady 400SP		3.615		26															117.5	2,720	c.u.p. 51,000	
A Square 400 Solid		3.680		26															117.0	2,705	c.u.p. 50,500	
<b>.44/40 Win.</b> Rem. 200SP	Rem. 2½	1.590	Rem.	24	14.5	1,230	c.u.p. 12,500															
Cast 240L		1.580		24	12.0	1,130	c.u.p. 12,500	23.5	1,290	c.u.p. 12,100												
<b>.444 Marlin</b> Speer 240SP	Rem. 9½	2.500	Rem.	24	25.0	1,730	c.u.p. 21,900	51.0	2,400	c.u.p. 38,100												
Cast (GC) 240L		2.500		24	22.0	1,725	c.u.p. 27,900	42.5	2,080	c.u.p. 28,900												
Hornady 265FP		2.500		24	25.0	1,715	c.u.p. 22,100	47.0	2,215	c.u.p. 35,800												
<b>.45/70 Govt.</b> Hornady 300HP	Rem. 9½	2.475	Rem.	24	30.0	1,650	c.u.p. 23,000	50.0	2,075	c.u.p. 24,700												
Cast (GC) 385L		2.575		24	25.0	1,340	c.u.p. 21,300	45.0	1,810	c.u.p. 25,100												
Speer 400FN		2.700		24	25.0	1,260	c.u.p. 24,000	40.0	1,580	c.u.p. 24,900	54.0	1,710	c.u.p. 26,100									
<b>.458 Win. Mag.</b> Hornady 300HP	Win. 8½-120	2.950	24	Win.	35.0	1,590	c.u.p. 13,500	70.0	2,555	c.u.p. 41,400												
Cast (GC) 385L		3.000		24	30.0	1,290	c.u.p. 14,200	65.0	2,285	c.u.p. 42,100												
Hornady 500FMJ		3.280		24	35.0	1,415	c.u.p. 32,600	64.0	2,000	c.u.p. 47,000												

NOTES and KEY pertain to Silhouette and Centerfire rifle tables.  
See *Special Reloading Precautions* on page 56.

**NOTES:**

1. Do not intermix cases of different manufacture, nor bullets, nor primers.
2. Be sure that each case is crackfree and completely empty.
3. Unless specifically recommended, use standard primers. Magnum primers are neither needed nor recommended for most calibers.
4. Do not exceed the powder weight shown, and guard against accidental multiple charges of powder.
5. Start with 10% less powder than shown. Work up gradually, watching for signs of high pressure.
6. Be sure that every completed cartridge is not shorter than the length listed.
7. Watch for signs of case head separation.

**KEY**

- |                        |                         |                            |
|------------------------|-------------------------|----------------------------|
| BR =Bench Rest         | M =Match                | in. =inches                |
| FMC =Full Metal Case   | psi =Chamber pressure,  | gr. =grains                |
| FMJ =Full Metal Jacket | piezo system            | Vel. =velocity             |
| FN =Flat Nose          | PSP =Pointed Soft Point | fps =feet per second       |
| FP =Flat Point         | RN =Round Nose          | c.w. =powder charge weight |
| FS =Fail Safe          | SB =Solid Base          | c.u.p. =chamber pressure,  |
| GC =Gas Check          | SJ =Semijacketed        | in copper units            |
| HB =Hollow Base        | SP =Soft Point          | Min =minimum overall       |
| HC =Hollow Cavity      | Sp. Pt. =Spire Point    | OAL =length, measured      |
| HP =Hollow Point       | WC =Wad Cutter          | from base to tip of bullet |
| J =Jacketed            | Wt =weight              |                            |
| L =Lead                | Bbl =barrel             |                            |

# Handloading Precautions

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1. **Understand what you are doing and why.** Read handbooks and manuals on reloading. Talk to experienced reloaders. Write or call suppliers of components if you have questions or are in doubt.
2. Stay *alert* when reloading. **Do not reload when distracted.**
3. Establish a loading procedure and follow it. **Do not vary your sequence of operations.**
4. **Examine empty cases** (shotshell or metallic) to be sure they are in good condition before reloading. Never force live cartridges into or out of the chamber of a gun.
5. **Do not use cases that are designed for primer-propelled practice cartridges;** such cases may not be designed for full power loads.
6. **Do not *ream out* or *enlarge flash holes* of metallic cartridge cases.** This may change the ignition rate and result in dangerous pressures.
7. **Do not punch out live primers.** Fire the empty primed shells in a gun.
8. **Do not mix primers.** Primers differ in brisance of ignition, which affects pressure and velocity. Use only the primer listed.
9. **The shotshell loading data in the *Reloaders' Guide* are for LEAD SHOT only. *DO NOT USE STEEL SHOT.***
10. One-piece plastic wads for shotshells vary in compressibility and gas-sealing effectiveness. Use only the wad listed.
11. If you “throw,” or measure powder charges by volume, check-weigh the charge frequently. **Do not *mix* powders.**
12. **Do not use powders near a flame, spark-producing machinery, or heating device.** Do not expose powders to temperatures above 100°F.
13. Keep out of reach of children.
14. **Do not smoke while reloading.**

# Crusher/Piezo Pressure Tabulation

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The following table lists the maximum average pressures, measured by the crusher system (c.u.p.) or piezo system (psi), utilized for the centerfire rifle recommendations in this brochure.

The values listed in the “c.u.p.” and “psi” columns are approximately the same pressure. The difference is due to the measuring system used and does not indicate that a pressure change has occurred.

Cartridge	C.U.P.	PSI	Cartridge	C.U.P.	PSI
.22-250 Remington	53,000	62,000	7mm Remington Magnum	52,000	61,000
.222 Remington	46,000	50,000	.280 Remington	50,000	60,000
.223 Remington	52,000	55,000	.30 Carbine	40,000	
6mm Remington	52,000	65,000	.30-06 Springfield	50,000	60,000
.243 Winchester	52,000	60,000	.30-30 Winchester	38,000	42,000
.25-06 Remington	53,000	63,000	.300 Savage	46,000	
.257 Roberts	45,000	54,000	.300 Winchester Magnum	54,000	64,000
.257 Roberts +P	50,000	58,000	.303 British	45,000	49,000
.270 Winchester	52,000	65,000	.308 Winchester	52,000	60,000
7mm-08 Remington	52,000	57,500	8mm Mauser	37,000	
7-30 Waters	40,000	45,000	8mm Remington Magnum	54,000	65,000
7 x 57 Mauser	46,000	51,000	.338 Winchester Magnum	54,000	64,000
			.35 Remington	35,000	
			.45-70 Government	28,000	

# Notes

## Some Publications on Reloading

These and other good literature pertinent to reloading usually are stocked at local gun and ammunition retail stores.

<u>Title</u>	<u>Publisher</u>
<i>Basic Rules for Reloading Safety</i>	National Reloading Manufacturers Association 4905 S. W. Griffith Drive Beaverton, OR 97005
<i>Handloading</i>	NRA Bookservice 11250 Waples Mill Road Fairfax, VA 22030
<i>Speer Reloading Manual</i>	Blount Industries Box 856 Lewiston, ID 83501
<i>RCBS Reloading Guide</i>	RCBS Box 1919 Oroville CA 95965
<i>Tips on Better Reloading</i>	Remington Arms Bridgeport, CT 06602
<i>Hornady Handbook of Cartridge Reloading</i> <i>Hornady Reloading Tools and Accessories</i>	Hornady Mfg. Co. Box 1848 Grand Island, NB 68801
<i>Sierra Bullets Reloading Manual</i>	Sierra 10532 Painter Avenue Santa Fe Springs, CA 90670
<i>Lyman Cast Bullet Handbook</i> <i>Lyman Shotgun Handbook</i> <i>Lyman Pistol and Revolver Handbook</i>	Lyman Products Middlefield, CT 06455
<i>Nosler Reloading Manual</i>	Nosler Bullets, Inc. P.O. Box 671 Bend, OR 97709
<i>How to Reload Shotshells and Why</i>	MEC 715 South Street Mayville, WI 53050
<i>Ponsness-Warren Catalog</i>	Ponsness-Warren Box 8 Rathdrum, ID 83858
<i>Handloaders' Digest</i> <i>ABC's of Reloading</i>	DBI Books 540 Frontage Road Northfield, IL 60093
<i>The Handbook of Shotgun Reloading</i>	SKR Industries, Inc. P.O. Box 1382 San Angelo, TX 76092



Alliant Techsystems  
New River Energetics  
Route 114 P.O. Box 6  
Radford, VA 24141-0096

**Visit our web site at**  
**<http://reloading.ATK.com>**