

WINCHESTER®

RELOADING COMPONENTS CATALOG



WINCHESTER® 

ADW-593-0494

COMPONENTS DIVISION



BALL POWDER® propellant loading data for shotshells,
centerfire rifle and handgun cartridges

14TH EDITION



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TABLE OF CONTENTS

Warnings

| | |
|---|---|
| Read Before Using Data | 2 |
| Black Powder Warning | 2 |
| Lead Warning | 2 |
| Dram Equivalent | 2 |
| Powder Storage Warning | 2 |
| Considerations for Storage of Smokeless Powder | 2 |
| Recommendations for Storage of Smokeless Powder | 3 |
| Primer Warnings | 3 |
| Reloading Precautions | 5 |

Components Section

| | |
|-------------------------|----|
| BALL POWDER® Propellant | 7 |
| Primer | 8 |
| Unprimed Case Listing | 9 |
| Winchester® Wads | 10 |
| Winchester Shot | 11 |

Shotshell Reloading

| | |
|--------------------------------|----|
| Empty Cases | 13 |
| Steel Shot Cautions | 13 |
| Buffered Shot Cautions | 13 |
| Slow Burning Shotshell Powders | 14 |
| Shotshell Loading Instructions | 14 |
| Selection of Shotshell Loads | 16 |
| Winchester Case Identification | 18 |

Shotshell Data

| | | |
|----------|--|----|
| 10 Gauge | 3 1/2" Winchester polyformed cases | 19 |
| 12 Gauge | 2 3/4" Winchester compression-formed cases | 19 |
| | 2 3/4" Winchester and Sears polyformed low brass, high paper basewad cases | 23 |
| | 2 3/4" Winchester polyformed low or high brass, plastic basewad cases | 23 |
| | 2 3/4" Winchester and Sears paper, low brass, high paper basewad cases | 23 |
| | 2 3/4" Remington-Peters SP plastic cases | 23 |
| | 2 3/4" Remington-Peters RXP plastic cases | 24 |
| | 2 3/4" Remington RTL hull | 24 |
| | 2 3/4" Peters Blue Magic cases | 26 |
| | 2 3/4" Federal paper, low brass, wound paper basewad cases | 26 |
| | 2 3/4" Federal Gold Medal hull | 26 |
| 12 Gauge | 3" Winchester compression-formed cases | 27 |
| | 3" Remington-Peters SP plastic cases | 27 |
| 16 Gauge | 2 3/4" Winchester compression-formed cases | 27 |
| 20 Gauge | 2 3/4" Winchester compression-formed cases | 28 |
| | 2 3/4" Remington-Peters RXP plastic cases | 29 |
| 20 Gauge | 3" Winchester compression-formed cases | 29 |
| 28 Gauge | 2 3/4" Winchester compression-formed cases | 29 |
| 410 Bore | 2 1/2" Winchester compression-formed cases | 29 |
| | 2 1/2" Remington-Peters SP plastic cases | 29 |
| 410 Bore | 3" Winchester compression-formed cases | 29 |
| | Powder Bushings and Scales | 30 |
| | Powder Bushing Charts | 30 |

Metallic Cartridge Reloading

| | |
|--|----|
| Data Generation | 37 |
| Powder Burning Rates | 37 |
| Metallic Reloading Instructions | 37 |
| Centerfire Rifle Loading Data | 38 |
| Rifle Case Dimensions | 39 |
| Rifle Data (Smallest to Largest Caliber) | 40 |
| Centerfire Handgun Loading Data | 44 |
| Handgun Case Dimensions | 44 |
| Handgun Data (Smallest to Largest Caliber) | 46 |
| Ballistic Terms and Definitions | 52 |

WARNINGS

Read before using data

This information is presented to furnish the reloader with current data for reloading shotshell and centerfire rifle and pistol ammunition. It is not a textbook on how to reload, but rather a useful reference list of recommended loads using Winchester® BALL POWDER® smokeless propellants.

Winchester is the only powder manufacturer which backs up their data with over 125 years of experience in manufacturing rifle, handgun and shotshell ammunition.

The data in this booklet are the culmination of very extensive testing which insures the reloader the best possible results.

The shotshell and metallic cartridge data in this booklet supersede all previous data published for Winchester Ball Powder smokeless propellants.

The data shown in this booklet has been verified by tests fired in our laboratory under controlled conditions and found to produce safe cartridges. Since we have no control over the actual loading procedures and methods used, or the condition or choice of firearms and components used and assembled, no responsibility for the use or safety in use of these data is assumed or implied.

Where data contained in this booklet list specific components, no changes or substitutions for these components can be made. The exception to this is substitutions of bullets of the same type, diameter, and weight from reputable manufacturers, without risking significant changes in the level of ballistic performance and/or safety of the loads shown.

WARNING - All smokeless powders are extremely flammable. Keep them stored in their original containers in locked cabinets, out of the reach of children or incompetent persons, and away from exposure to the sun's rays, heating equipment, electrical equipment, or any source of heat, flame or sparks.

WE MAKE NO WARRANTIES EXPRESS OR IMPLIED, LIMITED OR FULL; SPECIFICALLY DISCLAIM ANY AND ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY; AND SPECIFICALLY DISCLAIM ANY AND ALL LIABILITY FOR CONSEQUENTIAL DAMAGES OF ANY KIND WHATSOEVER.

FAILURE TO COMPLY WITH THESE WARNINGS OR TO USE THIS DATA EXACTLY AS SHOWN MAY RESULT IN ACCIDENTS WITH SERIOUS INJURY AND/OR DEATH TO THE SHOOTER AND/OR RELOADER AND/OR BYSTANDERS.

Black Powder - WARNING

Never substitute smokeless powder for black powder or Pyrodex or mix smokeless powder with black powder or Pyrodex. Never use smokeless powder in black powder firearms or in saluting cannons. Smokeless powder has much more energy than black powder or Pyrodex. Substituting or mixing powders may cause the firearm to blow up resulting in personal injury, property damage, or death.

Lead - WARNING

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 thoroughly after exposure.

Dram Equivalent - WARNING

Never use the dram equivalent measure as a weight for smokeless powders in reloading. Dangerously high pressures can occur and result in personal injury, property damage, or death.

Powder Storage - WARNING

The following information has been extracted from a pamphlet entitled "Properties and Storage of Smokeless Powder" issued by the Sporting Arms and Ammunition Manufacturers Institute (SAAMI) at P.O. Box 838, Branford, CT 06405. For a free copy of the complete pamphlet send a self-addressed, stamped envelope to the above address and request the pamphlet by title.

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 insulation 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 wall 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 laws, regulations and recommendations of the National Fire Protection Association (reprinted at end of SAAMI pamphlet).

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 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 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 powder for deterioration regularly. Destroy deteriorated powders immediately.

OBEY ALL LAWS AND 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 surrounding area is free of trash or other readily combustible materials.

HOW TO CHECK SMOKELESS POWDER FOR DETERIORATION

Powder deterioration can be checked by opening the cap on the container and smelling the contents. Powder undergoing deterioration has an irritating odor. (Don't confuse this with common solvent odors such as alcohol, ether and acetone.)

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 the person may retreat to a safe distance before powder is ignited.

Instructions & Warning for the Safe Storage and Handling of Primers

It is the responsibility of all persons who receive, store and use primers to be aware of the hazards and to know and follow all approved safety procedures. It is your responsibility to strictly comply with all applicable federal, state and local laws, regulations and ordinances.

Properties of Primers - DANGER

BULK STORAGE OF PRIMERS IS EXTREMELY DANGEROUS!!

Primers should never be stored, handled or used in bulk; i.e. piled or poured together. The energy of one exploding primer is sufficient to cause mass detonation of the surrounding primers. This could result in property damage and serious injury or death to operators and/or bystanders.

Note: Primers Should Always Be Kept In Their Original Factory Containers.

Primers contain mixtures of chemical ingredients designed to explode and provide the necessary energy in the form of hot particles, heat, & gas to ignite propellant powders.

Primers are sensitive to the following:

- Impact
- Friction
- Heat
- Flame
- Static Electricity
- Mishandling abuses

Conditions which may cause misfires or poor ignition:

- Exposure to water
- Exposure to organic solvents such as paint thinner, gasoline, oil, grease, penetrating lubricants, etc.

• Exposure to temperatures above 140 degrees Fahrenheit
Primers subjected to shaking, vibration, jolting, etc. may separate small particles of priming compound. This is referred to as "dusting". Accumulation of primer dust in primer feeds, on machine surfaces, in loading areas, etc. is extremely dangerous. Primer dust may cause fires and/or explosions due to heat, impact, friction, flame or static electricity. These areas must be kept very clean.

Storage of Primers—Store in a Cool Dry Place

BULK STORAGE OF PRIMERS IS EXTREMELY DANGEROUS!!

Primers should never be stored, handled or used in bulk; i.e. piled or poured together. The energy of one exploding primer is sufficient to cause mass detonation of the surrounding primers. This could result in property damage and serious injury or death to operators and/or bystanders.

Note: Store Primers in a Cool Dry Place Away From Heat, Sparks & Flame.

Cabinets designated for primers only are recommended. They should be constructed of materials designed to provide a substantial delay in the transmissions of heat in case of fire.

The storage area should be clean and free of other combustible materials such as propellant powders, solvents, flammable gases, etc. Avoid areas which may be subjected to high temperatures, open flames, furnaces, water heaters, direct sunlight, gunfire and bullet impact, the operation of mechanical or electrical equipment and static electricity.

Primers should be stored in original factory containers only. The packaging has been designed to minimize accidental ignition and to protect the consumers as well as the primers.

NEVER SMOKE IN PRIMER STORAGE AREAS.

Observe all federal, state and local laws, regulations and ordinances regarding quantities of primers stored and conditions of storage.

Handling of Primers - Handle with Care

BULK HANDLING OF PRIMERS IS EXTREMELY DANGEROUS!!

Primers should never be stored, handled or used in bulk; i.e. piled or poured together. The energy of one exploding primer is sufficient to cause mass detonation of the surrounding primers. This could result in property damage and serious injury or death to operators and/or bystanders.

Safety glasses should be worn at all times. Additional protection such as face shields and machine guards are also recommended for personal safety.

NEVER SMOKE WHILE HANDLING PRIMERS.

Primers are extremely sensitive and should always be handled with care.

Primers should be handled individually with adequate safeguards. The use of primer feeds for reloading is not recommended. Adequate protection from the danger of explosion must be provided by machine guards, barriers, etc.. Primer feeds allowing contact between or among individual primers cause a potentially dangerous condition and are to be avoided. One exploding primer could cause detonation of all primers in the area.

Do not decap live primers. It is recommended live primers be destroyed by firing the empty shell or cartridge in a suitable firearm.

Areas designated for the storage and/or handling of primers should require equipment and wiring methods suitable for hazardous locations (National Electrical Code, Class II, Div. I). Persons responsible for these areas should also observe and comply with all applicable federal, state and local laws, regulations and ordinances pertinent to their location.

Precautions should be taken to prevent the accumulation of static electricity on persons handling primers or conducting handloading procedures. Cotton clothing, conductive shoes & floors, individual ground straps, static bars, leg stats, and proper electrical/mechanical grounds all help to reduce, dissipate and/or eliminate the buildup of static electricity. Atmospheric conditions, especially low humidity, will increase the potential of static accumulation. The working area should be maintained at a comfortable temperature with a relative humidity of at least 60% to minimize static buildup and/or discharge.

Good housekeeping is a must for safe cartridge loading and primer handling. Equipment and work areas should be kept clean and free of loose primers, primer dust, propellant powder, and/or abra-

sive materials. A damp cloth or sponge should be used to clean contaminated areas and be thoroughly rinsed after use. Do not use a vacuum cleaner because fire or explosion may result.

Loading operations should be conducted with a minimum quantity of primers. Unused primers should be returned to the original package and placed in a designated safe storage area.

It is common sense to make primers unavailable to children, household pets, and any individuals that are not familiar with the potential danger of primers.

Never smoke or allow open flames, spark sources or hot particles near primers or loading areas.

Additional References:

- Sporting Arms & Ammunition Manufacturer's Institute (S.A.A.M.I.)
- National Electrical Code (NEC)
- National Fire Protection Association (NFPA) 495, Explosive Materials Code
- Occupational Safety & Health Administration (OSHA)

Reloading Precautions – WARNING

Follow these precautions to assure maximum enjoyment and safety in reloading and uniform performance of your reloads. Remember you can suffer severe burns, be badly injured, or killed if the strictest safety precautions and housekeeping rules are not enforced.

1. Exercise care at all times. Wear safety glasses while reloading.
2. Never smoke while handling powder or primers or during any reloading operation.
3. Keep powder and primers away from heat, sparks and open flames.
4. Store powder in a cool, dry place at all times.
5. Never use a powder unless you are certain of its identity.
 - Always read warnings on powder and component container labels.
 - Always read and understand the instruction manual for your reloading machine/tools.
 - Always reload in strict compliance with instructions in current reloading manuals.
6. Do not mix powders.
7. Devote full attention to reloading operations—avoid distractions.
8. Keep powder and primers out of reach of children.
9. Use components as recommended; don't take shortcuts.
10. Never exceed maximum recommended loads.
11. Examine every shell or cartridge before loading to insure good condition.
12. Double check every operation for safety and uniformity.
13. Check powder charge level in shells to avoid double charges.
14. On centerfire loads, start with charge weights 10% below recommended maximum loads.
15. Always watch for indications of excessive pressure.
16. Do not decap live primers; it is safer to destroy them by firing the empty shell or cartridge in a firearm.
17. Do not substitute components, except bullets of the same type and weight from reputable manufacturers. It could result in a significant change in ballistics, and unsatisfactory or even dangerous load.
18. Observe all local fire regulations and codes with respect to quantities of powders and primers stored and conditions of storage.
19. Store powder in its original container. Never transfer it from one storage container to another since this increases the possibility of becoming mislabeled.
20. Do not use the shotshell data contained in this handbook with steel shot; to do so would cause an extremely dangerous condition. Steel shot requires the use of special data, wads and powders. When such components become available, Winchester will develop data specifically for steel shot.

CAUTION: DO NOT INTERCHANGE FED 209 AND FED 209A PRIMERS

COMPONENTS



COMPONENTS SECTION

BALL POWDER® Propellant

BALL POWDER smokeless propellant is the product of an exclusive manufacturing process carried on commercially by **Olin Corporation** since 1933. Although it is made from conventional propellant materials, plus other compounds which control ignition and burning rates, its method of manufacture makes it entirely different in appearance and performance.

Winchester® smokeless propellants meet almost every reloading requirement. Our exclusive manufacturing process produces powder with excellent ballistic uniformity. Smooth flowing for precision metering, cleaner and cooler burning—these are just some of the advantages you'll have when you use Winchester Ball Powder propellant. It fulfills the specific requirements of the most discriminating reloader. Winchester Ball Powder propellant duplicates the exact same high standards and quality of Winchester factory loads.

The advantages of Winchester BALL POWDER propellant are many. Here are a few:

- 11 different BALL POWDER propellants—for shotguns, rifles and handguns—for a wide range of calibers and gauges.
- High energy, clean burning.
- All Winchester powders are double-based for maximum energy.
- Winchester BALL POWDER propellant exhibits the greatest chemical stability ever attained in a small arms propellant.
- Very high grain density.
- Low barrel erosion due to lower flame temperature for a given speed of powder.
- Less muzzle flash.
- High accuracy (and ballistic uniformity).
- Excellent and uniform flow and packing qualities in powder measures result in more uniform "thrown" charges.

A brief description of the line of Winchester BALL POWDER propellants follows (each powder number has a color-coded label distinct to itself):

WST Super-Target® is the propellant of choice for Winchester factory target shotshell loads. Due to its low gravimetric density, WST's fast burn rate results in a clean burning load. In addition to target shotshell, WST is an excellent choice in standard velocity handgun loads such as 38 Special and 45 ACP due to its low charge weight, clean burning and low muzzle flash. Use this competition proven powder with Winchester components and duplicate factory load ballistics.

WSL Super-Lite® is the propellant of choice for Winchester Super-Lite Target Loads. WSL burns at lower pressures to reduce felt recoil without reducing velocity performance. Super-Lite works well in 9mm and 40 S&W as a low charge weight propellant. Combine Winchester components with WSL to duplicate factory load ballistics.

231 As the most popular reload propellant, 231 is a high energy pistol powder that is great for 38 Special, 45 ACP and 9mm standard velocity loads. Due to a unique density lowering process during its manufacturing, it is cleaner burning than some other popular powders in this speed range. 231 is a popular propellant with police departments.

WSF Super-Field® is the propellant of choice for Winchester 20 gauge AA® Target Load and 12 gauge 3 3/4 dram equivalent Super-X® load. WSF is an ideal choice to maximize velocities in 12 gauge 1 1/8 oz. and 1 1/4 oz. loads. Super-Field also performs well in 38 Super, 9mm and 40 S&W pistol loads.

NEW WAP Winchester Action Pistol™ propellant is one of the two new reloading powders introduced in 1994. After years of product development, a clean burning, low muzzle flash, low recoil propellant was completed to be factory loaded in Winchester 9mm and 40 S&W ammunition. WAP has a lower flame temperature than competitive products which extends barrel life. This powder is the propellant of choice for premium factory loaded high performance ammunition. Ideal for use in competitive action pistol competition in 38 Super, 9mm and 40 S&W.

540 A versatile propellant that works well in 12 gauge 1 1/4 oz. and 1 1/2 oz., 20 gauge 1 oz. and 28 gauge 3/4 oz. loads. As a high density propellant, 540 is an excellent choice to maximize velocities with minimal recoil in these loads. Suitable as a handgun propellant in 38 Super, 9mm, 40 S&W and 10mm loads.

571 A magnum shotshell propellant designed to maximize velocities in 12 gauge 1 3/8 oz and 1 1/2 oz loads and other heavy field loads. 571 also obtains high velocities in 20 gauge and 28 gauge loads. Suitable as a handgun propellant in 38 Super, 9mm, 40 S&W and 10mm loads.

296 This propellant was developed for Winchester factory loaded ammunition for 357 magnum, 44 magnum and 410 bore. Its high loading density provides optimal velocity and powder positioning performance. 296 is also the powder type used by Winchester for factory loaded 410 bore AA loads. However, 296 is not suitable for most rifle cartridges.

748 748 is the powder of choice by Winchester and the U.S. military for 5.56mm and 223 Rem. ammunition. The low flame temperature of 748 extends barrel wear versus other similar speed powders. It can be used in a wide variety of centerfire rifle loads including 222 Rem, 30-30 Win and 308 Win. Combine Winchester components with 748 to duplicate 308 Win factory load ballistics. 748 is recommended for use with the new 308 Fail Safe™ bullets.

760 Combine Winchester components with 760 to duplicate 30-06 factory load ballistics. 760 has ideal flow characteristics which give it an advantage over other propellants with similar burn rates. 760 is recommended as an excellent choice for 7mm-08 as well as with the new 30-06 Fail Safe bullet.

NEW WMR Winchester Magnum Rifle™ propellant is one of the two new reloading powders introduced in 1994. WMR is the propellant of choice for 270 Win, 243 Win and 300 Win Mag Winchester factory loaded ammunition. WMR brings to the marketplace a propellant with low flame temperature and ideal flow characteristics. It is an excellent magnum rifle propellant that can also be used in 257 Roberts, 25-06, 280 Rem and 338 Win Mag.

NOTE: 452AA, 473AA and 680 powders have been discontinued.

**BALL POWDER Smokeless Propellants
are available in the following sized containers**

| Symbol | Type | Unit | Units Per Case | Case Wt. Lbs | Symbol | Type | Unit | Units Per Case | Case Wt. Lbs |
|--------|--------------------------|--------|----------------|--------------|--------|---------------------|--------|----------------|--------------|
| 231 | Handgun | 1 Lb. | 10 | 14 | WSF | Shotshell & Handgun | 1 Lb. | 10 | 13 |
| 2311 | Handgun | 3 Lbs. | 6 | 24 | WSF1 | Shotshell & Handgun | 3 Lbs. | 6 | 24 |
| 2313 | Handgun | 8 Lbs. | 4 | 38 | WSF3 | Shotshell & Handgun | 8 Lbs. | 2 | 19.5 |
| WAP | | | | | WSF8 | Shotshell & Handgun | | | |
| WAP1 | Handgun | 1 Lb. | 10 | 13 | 540 | Shotshell & Handgun | 1 Lb. | 10 | 14 |
| WAP3 | Handgun | 3 Lbs. | 6 | 24 | 5401 | Shotshell & Handgun | 3 Lbs. | 6 | 24 |
| WAP8 | Handgun | 8 Lbs. | 2 | 19.5 | 5403 | Shotshell & Handgun | 8 Lbs. | 4 | 38 |
| 296 | | | | | 5408 | Shotshell & Handgun | | | |
| 2961 | Mag. Handgun & Shotshell | 1 Lb. | 10 | 14 | 571 | Shotshell & Handgun | 1 Lb. | 10 | 14 |
| 2963 | Mag. Handgun & Shotshell | 3 Lbs. | 6 | 24 | 5711 | Shotshell & Handgun | 3 Lbs. | 6 | 24 |
| 2968 | Mag. Handgun & Shotshell | 8 Lbs. | 4 | 38 | 5713 | Shotshell & Handgun | 8 Lbs. | 4 | 38 |
| WST | | | | | 5718 | Shotshell & Handgun | | | |
| WST1 | Shotshell & Handgun | 1 Lb. | 10 | 13 | 7481 | Rifle | 1 Lb. | 10 | 14 |
| WST3 | Shotshell & Handgun | 3 Lbs. | 6 | 24 | 7488 | Rifle | 8 Lbs. | 4 | 38 |
| WST8 | Shotshell & Handgun | 8 Lbs. | 2 | 19.5 | 760 | Rifle | 1 Lb. | 10 | 14 |
| WSL | | | | | 7601 | Rifle | 8 Lbs. | 4 | 38 |
| WSL1 | Shotshell & Handgun | 1 Lb. | 10 | 13 | 7608 | Rifle | 1 Lb. | 10 | 14 |
| WSL3 | Shotshell & Handgun | 3 Lbs. | 6 | 24 | WMR | Magnum Rifle | 8 Lbs. | 2 | 19.5 |
| WSL8 | Shotshell & Handgun | 8 Lbs. | 2 | 19.5 | WMR1 | Magnum Rifle | | | |
| | | | | | WMR8 | Magnum Rifle | | | |

Winchester Primers

You can't buy a more reliable primer than Winchester. Ignition is instant and precise. In Winchester testing labs, primers are constantly and rigorously tested for consistency and sensitivity at temperatures and conditions far beyond the range of normal usage. Ignition reliability is assured when you use Winchester primers.

- Better sensitivity for more positive firing in all guns.
- Large rifle magnum primer for those heavy charges of slow powder where extra ignition is required. Use only where magnum primers are specified.
- 7 different primers cover your reloading needs for shotshells, rifle and handgun cartridges.
- Non-corrosive, non-mercuric.
- Weight of the primer mixture is carefully controlled.
- Every Winchester primer is consistent in size and quality.
- Anvil heights are measured to precise tolerances to assure perfect ignition.
- Winchester primers maintain stability in extremes of temperature and humidity.

WARNING— Primers may explode if subjected to impact, shock, or intense heat. Store in original factory container only. Primers in bulk are capable of mass explosion. Do not use in primer feed devices for reloading.

**Winchester Staynless Primers
Centerfire primers are recommended for use as follows:**

| Large Rifle-WLR | | | |
|-----------------------|-----------------------|-------------------------|--------------------------|
| 220 Swift | 270 Winchester | 300 H&H Magnum | 348 Winchester |
| 22-250 Remington | 284 Winchester | 300 Savage | 35 Remington |
| 225 Winchester | 7mm Mauser | 303 Savage | 356 Winchester |
| 243 Winchester | 280 Remington | 303 British | 358 Winchester |
| 6mm Remington | 7mm Express Rem. | 308 Winchester | 350 Remington Magnum |
| 25-35 Winchester | 7mm Remington Magnum | 32 Winchester Special | 375 Winchester |
| 250 Savage | 7.62 x 39mm | 32 Remington | 375 H&H Magnum |
| 25-06 Remington | 30-30 Winchester | 32-40 Winchester | 38-55 Winchester |
| 257 Roberts +P | 30 Remington | 8mm Mauser | 416 Remington |
| 6.5 Remington Magnum | 30-06 Springfield | 8mm Remington Magnum | 444 Marlin |
| 264 Winchester Magnum | 30-40 Krag | 338 Winchester Magnum | 45-70 Government |
| 7mm-08 Remington | 300 Winchester Magnum | 458 Winchester Magnum | |
| Small Rifle-WSR | | Small (Reg) Handgun-WSP | |
| 218 Bee | 25 Automatic | 9mm Winchester Mag. | 38-40 Winchester |
| 22 Hornet | 30 Luger | 38 S&W | 10mm Automatic |
| 222 Remington | 32 Automatic | 38 Special | 41 Magnum |
| 222 Remington Magnum | 32 S&W | 38 Short Colt | 44 S&W Special |
| 223 Remington | 32 S&W Long | 38 Long Colt | 44-40 Winchester |
| 25-20 Winchester | 32 Short Colt | 38 Colt New Police | 44 Magnum |
| 256 Winchester Magnum | 32 Long Colt | 38 Super Auto +P | 45 Colt |
| 30 Carbine | 32 Colt New Police | 38 Automatic | 45 Automatic |
| 357 Remington Maximum | 9mm Luger | 380 Automatic | 45 Winchester Magnum |
| | | 40 S&W | Small (Mag) Handgun-WSPM |
| | | | 357 Magnum |

Packed 100 per box

| Symbol | Primer | Type | Case Contains | Case Wt. Lbs. (approx.) |
|--------|---------------|-------------------------|---------------|-------------------------|
| W209 | #209 | Shotgun Shells | 5,000 | 15 |
| WLR | #8 1/2 - 120 | Large Rifle | 5,000 | 7 |
| WLRM | #8 1/2M - 120 | Large Rifle (Magnum) | 5,000 | 7 |
| WSR | #6 1/2 - 116 | Small Rifle | 5,000 | 5 |
| WSP | #1 1/2 - 108 | Small (Regular) Handgun | 5,000 | 5 |
| WLP | #7 - 111 | Large (Regular) Handgun | 5,000 | 7 |
| WSPM | #1 1/2M - 108 | Small (Magnum) Handgun | 5,000 | 5 |

Unprimed Cases for Rifles and Handguns

Winchester brass cases have to take a lot. The 30-06 case, for example, is hit with approximately 24 tons of pressure at every firing. Yet our cases can be resized. Again and again.

The reason? Precise engineering, meticulous attention to small details, and custom formulation in our own brass mill. The brass in the cartridges, made especially for our components, is carefully annealed to meet the stresses incurred in firing, resizing and bullet seating. Winchester's annealing process gives the right degrees of hardness in neck, body and base.

- Cases made in most popular calibers.
- Exact tolerances provide dependable functioning and reliability for rifle and handgun reloading.

| Winchester Unprimed Cases for Handguns | | | Winchester Unprimed Cases for Rifles (cont'd) | | |
|--|-----------------------------|--------------------|---|-------------------------------|--------------------|
| Symbol | Caliber | Wt. Lbs.± Per Case | Symbol | Caliber | Wt. Lbs.± Per Case |
| U9MM | *9mm Luger | 4 | U270 | 270 Winchester | 16 |
| U9MMWM | *9mm Winchester Magnum | 7 | U280 | 280 Remington (Nickel Plated) | 17 |
| U38SP | *38 Special | 5 | U284 | 284 Winchester | 17 |
| U38A | *38 Automatic (& 38 Super) | 5 | U7MM | 7mm Mauser | 14 |
| U357 | *357 Magnum (Nickel Plated) | 6 | U7MAG | 7mm Remington Magnum | 19 |
| U357MAX | *357 Remington Maximum | 9 | U30C | *30 Carbine | 6 |
| U41 | *41 Remington Magnum | 9 | U3030 | 30-30 Winchester | 12 |
| U44S | *44 S&W Special | 9 | U3006 | 30-06 Springfield | 16 |
| U44M | *44 Remington Magnum | 9 | U3040 | 30-40 Krag | 15 |
| U45C | *45 Colt | 9 | U300WM | 300 Winchester Magnum | 21 |
| U45A | *45 Automatic | 7 | U300H | 300 H&H Magnum | 21 |
| U45WM | *45 Winchester Magnum | 9 | U300 | 300 Savage | 13 |
| Winchester Unprimed Cases for Rifles | | | U307 | 307 Winchester | 14 |
| U218 | *218 Bee | 6 | U308 | 308 Winchester | 14 |
| U22H | *22 Hornet | 4 | U303 | 303 British | 14 |
| U22250 | 22-250 Remington | 14 | U3220 | *32-20 Winchester | 5 |
| U220S | 220 Swift | 13 | U338 | 338 Winchester Magnum | 20 |
| U222R | 222 Remington | 8 | U348 | 348 Winchester | 19 |
| U223R | 223 Remington | 8 | U356 | 356 Winchester | 15 |
| U225 | 225 Winchester | 12 | U358 | 358 Winchester | 15 |
| U243 | 243 Winchester | 14 | U375H | 375 H&H Magnum | 20 |
| U6MMR | 6mm Remington | 15 | U375W | 375 Winchester | 20 |
| U2520 | *25-20 Winchester | 6 | U4440 | *44-40 Winchester | 9 |
| U2506 | 25-06 Remington | 16 | U44M | *44 Remington Magnum | 9 |
| U257P | 257 Roberts +P | 14 | U4570 | 45-70 Government | 15 |
| U264 | 264 Winchester Magnum | 19 | U458 | 458 Winchester Magnum | 19 |

All unprimed cases are packed 500 to a case. *Packed 50 per box, all other packed 20 per box. ± Weights. to nearest lb.

Winchester Wads

Reloaders seldom give wads the same critical attention given to other components. Often the result is poor performance—due entirely to the wad. Take a moment to review the high quality features of Winchester wads. For consistent, dependable performance shot after shot, ask for Winchester AA® wads.

- Available in 12, 16, 20, 28, and 410, for all kinds of loads: target and field.
- Designed for the proper rate of collapse.*
- Forms the right shape cup over the powder for proper obturation.
- Cushions the initial shock, designed to take the bite out of recoil.
- Petal design protects the shot against flat-spotting, minimizes flyers in the pattern.
- The uniform ballistics obtained with brand name wads may not be achieved with lower cost substitutes.

* Wad must collapse at pre-determined rate in order to insure the proper pressure curve from the burning powder.

Winchester shot-protector wads of the Double A® type are available to the handloader in nine types in five different gauges. All wads are packed 250 per container. The 12, 16 and 20 gauge wads are packed 5,000 per case. The 28 gauge and 410 wads are packed 2,500 per case.

1. **WAA12**—white one-piece wad for use in 12 gauge Double A, Upland, Xpert and Super-X cases for 1 to 1 5/8 ounce loads for trap, skeet and field loads and other loads as shown in the data. Packed in a special box container to prevent bent petals.
2. **WAA12R**—red one piece wad for use in a wide variety of cases, including Double A, Upland, Xpert and Super-X cases, and for heavy field loads. Also for use in paper cases for trap, skeet and field loads
3. **WAA12F114**—a yellow flared petal Double A type wad designed specifically for 12 gauge field loads with 1 1/4 ounce and 1 3/8 ounce shot charges.
4. **WAA12SL**—pink one piece wad used in 12 gauge for 1 to 1 1/8 ounce loads, but can be used anywhere 1 ounce WAA12F1 wad was recommended. Anytime WSL powder is used the WAA12F1 wad **CANNOT** be substituted for WAA12SL. A tight crimp offers the best performance. Duplicate the length of factory Super-Lite® loads for top performance. Packed in a special box container to prevent bent petals.
5. **WAA16**—blue one-piece wad used in 16 gauge Upland, Xpert and Super-X cases for 1 ounce to 1 1/8 ounce trap, skeet and field loads.
6. **WAA20**—white one-piece wad for use in 20 gauge Upland, Xpert and Super-X cases for skeet and field loads for 7/8 to 1 1/4 ounce loads. Also useful in other applications as specified in the data.
7. **WAA20F1**—a yellow flared petal Double A type wad designed specifically for 20 gauge field loads with 1 ounce to 1 1/8 ounce shot charges.
8. **WAA28**—pink one-piece wad for use in 28 gauge Double A and Super-X cases for skeet and field loads.
9. **WAA41**—white one-piece wad for use in 410 bore Double A and Super-X cases for skeet and field loads.



WAA12F114 (yellow) WAA12 (white) WAA12SL (pink) WAA12R (red) WAA16 (blue) WAA20F1 (yellow) WAA20 (white) WAA28 (pink) WAA41 (white)

Winchester Shot

High-quality lead shot made the old-fashioned best way—dropped from a seven-story shot tower continuously screened and rolled across multiple glass tables to insure only the best, roundest shot is bagged. Offered in regular chilled and AA special hard shot.

| Shot Charge | Standard Shot Size | | | | | | | |
|-------------|--------------------|-----|-----|-----|--------|-----|--------|------|
| | Shot Size | | | | | | | |
| | #2 | #4 | #5 | #6 | #7 1/2 | #8 | #8 1/2 | #9 |
| 1/2 oz. | 45 | 67 | 85 | 112 | 175 | 205 | 242 | 292 |
| 3/4 oz. | 67 | 101 | 127 | 168 | 262 | 308 | 363 | 439 |
| 7/8 oz. | 79 | 118 | 149 | 197 | 306 | 359 | 425 | 512 |
| 1 oz. | 90 | 135 | 170 | 225 | 350 | 410 | 485 | 585 |
| 1 1/8 oz. | 101 | 152 | 191 | 253 | 393 | 461 | 545 | 658 |
| 1 1/4 oz. | 112 | 169 | 213 | 281 | 437 | 513 | 605 | 731 |
| 1 3/8 oz. | 124 | 186 | 234 | 309 | 481 | 564 | 665 | 804 |
| 1 1/2 oz. | 135 | 202 | 255 | 337 | 525 | 615 | 730 | 877 |
| 1 5/8 oz. | 146 | 220 | 276 | 366 | 569 | 666 | 790 | 951 |
| 1 7/8 oz. | 169 | 253 | 319 | 422 | 656 | 769 | 850 | 1097 |
| 2 oz. | 180 | 270 | 340 | 450 | 700 | 820 | 970 | 1170 |
| 2 1/4 oz. | 202 | 304 | 382 | 506 | 786 | 922 | 1090 | 1316 |

This tabulation gives the approximate number of pellets per shotshell load for shot sizes 2 through 9. The exact number of pellets will vary, depending on exact alloy content. For example, chilled shot vs. soft shot. Variations in shot pellet diameter will also affect the exact number of pellets per load when shot charge is thrown by volume rather than by weight.

Component Shot Chart—Diameter in Inches

Winchester uniform, chilled lead shot provides consistent shot patterns and better penetration. Strict quality control throughout the manufacturing process assures the ultimate in performance. All Winchester shot available in 25 pound bags.

| 9 | 8 | 7 1/2 | 6 | 5 | 4 | 2 | BB |
|--|-----|-------|-----|-----|-----|-----|-----|
| | | | | | | | |
| .08 | .09 | .095 | .11 | .12 | .13 | .15 | .18 |
| APPROXIMATE NUMBER OF PELLETS TO THE OUNCE | | | | | | | |
| 600 | 405 | 345 | 220 | 170 | 135 | 90 | 50 |

| Chilled Shot | |
|------------------------|----------------|
| Winchester Shot Symbol | Description |
| SC2Y | #2 Chilled |
| SC4Y | #4 Chilled |
| SC5Y | #5 Chilled |
| SC6Y | #6 Chilled |
| SC75Y | #7 1/2 Chilled |
| SC8Y | #8 Chilled |
| SC9Y | #9 Chilled |

| Hard Shot | |
|------------------------|-------------|
| Winchester Shot Symbol | Description |
| SC75YH | #7 1/2 Hard |
| SC8YH | #8 Hard |
| SC9YH | #9 Hard |

| No. 4 Buck | No. 00 |
|------------------------------|--------|
| | |
| .24 | .33 |
| APPROXIMATE NO. TO THE POUND | |
| 340 | 130 |

SHOTSHELL



SHOTSHELL RELOADING

Source of Empty Cases

All Winchester® cases used in shotshell reloading are obtained as a result of the first firing of factory loaded ammunition. In a great many instances, once-fired Double A® cases and other Winchester shotshells can be purchased from local skeet and trap ranges, gun clubs, and dealers catering to the shotshell reloaders. In case this service is not available, the only means of obtaining these cases would be as the result of firing factory ammunition.

Powder Bushings and Scales

Shotshell reloading tool powder bushings do not throw the exact charge specification in many cases. The reasons are many and include:

1. Variations in gravimetric density of powders from lot to lot. The tolerance is plus or minus .025 grams per cubic centimeter. This tolerance applies to most canister powders.
2. Usually a bushing chart lists the nominal weight of a powder charge based on normal packing as a result of free flow and gravimetric density of a powder or on a bushing volume and the nominal gravimetric powder density at 100% packing.
3. Various operators of a tool will get various powder weight from an identical tool and bushing. This is due to the change in force of operation and the amount of vibration transmitted to the tool with resultant amount of packing of powder.
4. The amount of sizing force required on cases being loaded can cause a change in powder drop due to the change in tool vibration.
5. Bushing manufacturing tolerances.
6. Tool manufacturing tolerances.
7. Mismatched bushings.

A bushing listing chart cannot be interpreted as an absolute. It can represent what the manufacturer believes to be the nominal charge thrown with the listed bushing and powder.

A reloading scale is an absolute must. Charges thrown must be carefully checked and changes in bushing sizes made where required.

Do not try to determine the powder charge thrown by simply metering the powder bar back and forth and weighing charges. The tool must be cycled through the complete loading cycle to insure the same amount of vibration and powder packing as will take place in a normal loading cycle. Powder charges measured under the two conditions could vary as much as several grains.

For your reference, bushing charts are on pages 30 thru 35.

WARNING—Steel Shot

With reference to the repeated inquiries on the reloading of steel shotshells, Winchester's advice, at this time, is:

"DON'T DO IT!"

Wait until suitable components and tested data are available from the ammunition makers.

At this time, key components, for acceptable steel shot loads, are not widely available to reloaders. This includes "soft" steel shot, the special plastic wads and shot sleeves designed for use with such shot, and the special powder required.

Some steel shot pellets have a diamond pyramid hardness of up to 270, as compared to the desired DPH of about 90 for the soft steel shot being used in commercial shot loads.

In some cases, available steel pellets are harder than the gun barrel in which they would be fired and can severely score barrel walls and distort barrel chokes.

Commercial steel shot loads have special wads and thick plastic shot sleeves helping to shield the barrel wall from the shot pellets. The shot sleeves used in lead shot loads are not sufficient to protect gun barrels from damage due to steel shot.

The reloading of steel shot loads, entirely different than loading lead shot ammunition, requires all new components and data. The attempt to load steel shot loads, with current components, would damage your gun and could injure the shooter or bystander.

Basically, when reliable data is available, the recommendations are as follows:

1. DO NOT RELOAD STEEL SHOTSHELLS WITH ANY COMPONENT OTHER THAN THOSE SPECIFICALLY RECOMMENDED BY THE MANUFACTURER AS SUITABLE FOR SUCH LOADS.
2. DO NOT USE STEEL SHOT COMPONENTS IN LEAD SHOT LOADS UNLESS THE MANUFACTURER RECOMMENDS SUCH DUAL APPLICATION.

Steel shot components are not currently available from Winchester.

Buffered Shot Cautions

The use of any buffering material in a shot column will significantly alter the ballistics for any given shotshell load. Also, if not carefully tested, buffering materials can produce dangerously high pressures. The development of loading data for any buffered load requires extensive pressure and velocity testing to insure the proper speed propellant powder and propellant charge weight are being used for the specific buffering material.

The use of talc, flour, and similar non-compressible materials should not be considered as buffering materials as they can produce dangerously high, erratic pressures in an unpredictable manner.

The rate with which shotshell propellant burns within a shotshell is governed to a great extent by the uniform compressibility of the wadding and the shot itself. Changes in the compressibility, such as is the case with buffering materials, can drastically change the burn rate of the propellant. Careful testing is required to assure the load will not result in a damaged gun, personal injury or death. We do not suggest the use of buffered shot reloads without lab testing.

Slow Burning Shotshell Powders

Slow burning powders always leave more residue than fast burning powders, all other things being equal. This can be verified by comparing the results of firing a box of factory 1 ounce loads with a box of factory 1 1/2 ounce loads. The heavier loads will leave behind considerably more residue. The reloader can take certain steps to help eliminate, as much as possible, the amount of residue left in his firearm.

The first step would be with the case itself. Do not use cases loaded more than two or three times for these loads. You need a good firm crimp to offer the proper amount of resistance to the initial burning of slow powders. A case loaded a number of times simply does not afford the firm crimping required.

Secondly, the primer selection is limited on these loads. If the cleanest possible burning is to be obtained, we suggest only Winchester 209's. Be sure to use the specific primer listed for the load and do not make substitutions from data listings.

The third item is wad pressure. A wad pressure of 60 to 70 lbs. seems to help. **Great care must be taken** to insure the lips of the over powder cup section are not damaged or torn when seating the wad. (Wad guide fingers should be in good condition.) Do not substitute wads, use data only as listed.

Fourth, powder charges and shot weights must be checked with a scale. Do this while the loading machine is being cycled. This is very important.

Fifth, every effort must be made to make as firm a crimp as practical. It is important the finished shell length not exceed a factory loaded round and the depth of crimp be as deep as a factory round. Also, put a good bevel on the shell mouth when crimping. This tends to strengthen the crimp. No sealers should be used on the crimp.

If the maximum of each of the foregoing points is built into heavy reloads, it will reduce the amount of fouling to a minimum. However, heavy reloads will always leave some fouling. Semiautomatics are prone to the most fouling. Clean guns carefully after each hunting trip if more than 25 rounds have been fired. Most firearms will function with a good amount of fouling present but a good cleaning after each trip is proper maintenance to insure the maximum in reliability from the firearm.

Shotshell Loading Instructions

CAUTION: Carefully read the information on the powder can label and follow the recommended loading instructions and precautions contained herein, before using the reloading data.

Winchester suggested loads are based on results obtained in our laboratory under carefully controlled conditions. They are offered without fee as an aid to handloaders, to be employed at their own discretion and risk. Since Winchester has no control over the circumstances of loading, Winchester assumes no liability for the results obtained.

The handloading of shotshells should be undertaken only by those familiar with all safety precautions and observe conservative practices in reloading operations. The powder charges shown are maximum and must not be exceeded.

Cases

Exercise extreme care in determining use of the exact case listed in the data. Substitution could be dangerous. **When in doubt contact the manufacturer of the case.**

Primers

Use only those primers which are specifically shown in the data; do not substitute one primer for another. To do so could result in a significant change in ballistics, and could result in an unsatisfactory or even dangerous load. Never use shotshell primers having uncovered flash holes with BALL POWDER® smokeless propellants. To do so could be dangerous.

Powder

Check all powder charges with a scale. Check about 10 shells to determine the average weight of charges thrown and the uniformity of the charge. Powder bushing charts are shown in this book to assist you in the selection of bushings. The information contained in these charts has been supplied by the manufacturer of the bushings.

Such charts do not represent loading tables and list only the approximate powder charge dropped by the listed bushing. Variations in how the loading tool is handled, in the bushings themselves and in the specific components used, will alter the charges thrown. **It is essential to check charge weight with a scale** and go to the next larger or smaller bushing when and where required.

Wads

Use only those wads as specifically shown in the data; do not substitute one wad for another. To do so could result in a significant change in ballistics and could result in an unsatisfactory or even dangerous load. The uniform ballistics obtained with brand name wads may not be achieved with lower cost substitutes.

Wad Seating Pressure

Wad pressure, when using BALL POWDER propellant, is not critical. Any pressure from 0 to 100 pounds is acceptable. The only criterion is enough pressure must be used to insure a good crimp. A safe level to use is 40 pounds, from which the loader may vary at his own choice to get the best crimp. Wads must be seated on the powder (no air space should exist between wad and powder).

Do not load any components that require more than 100 pounds wad pressure

Shot Bushing Diameters

| | | | |
|--------------|----------------|----------------|----------------|
| .424-1/2 Oz. | .565-7/8 Oz. | .664-1 1/4 Oz. | .750-1 5/8 Oz. |
| .477-5/8 Oz. | .596-1 Oz. | .695-1 3/8 Oz. | .780-1 3/4 Oz. |
| .517-3/4 Oz. | .641-1 1/8 Oz. | .721-1 1/2 Oz. | .809-1 7/8 Oz. |

Velocity

Velocities quoted in the data are averages of a series of shots fired in accordance with equipment and techniques used throughout the American arms and ammunition industry. Listed loads have given uniform velocity results in tests.

Shotshell velocity barrels used conform to the following lengths as approved by SAAMI*

| | | | |
|---------------|----------------|-----------------------|----------------|
| 10 ga.-3 1/2" | Full Choke 32" | 20 ga.-3" | Full Choke 30" |
| 12 ga.-3" | Full Choke 30" | 20 ga.-2 3/4" | Full Choke 26" |
| 12 ga.-2 3/4" | Full Choke 30" | 28 ga.-2 3/4" | Full Choke 26" |
| 16 ga.-2 3/4" | Full Choke 28" | 410 bore-2 1/2" or 3" | Full Choke 26" |

*Sporting Arms and Ammunition Manufacturers Institute

Pressure Data

All pressure data listed as psi has been measured with the latest Piezo electric system showing actual pounds per square inch (psi) and **cannot** be compared directly to the old data which used the lead crusher method (LUP).

Black Powder Warning: Never substitute smokeless powder for black powder or Pyrodex or mix smokeless powder with black powder or Pyrodex. Never use smokeless powder in black powder firearms or in saluting cannons. Smokeless powder has much more energy than black powder or Pyrodex. Substituting or mixing powders may cause the firearm to blow up resulting in personal injury, property damage, or death.

Pressure Data

Ballistics of shotshells are affected not only by the type and amount of powder, but also by the pellet size and charge weight of shot, the type of crimp, the type of shotshell case, and the type of wads used. Follow loading data instructions and do not deviate from recommended combinations.

It should be noted that low chamber pressures do not necessarily mean low recoil. Recoil is a function of the velocity of the ejecta from the muzzle and the weight of the ejecta. It is basic physics. For every action there is an equal and opposite reaction. Kick, or felt recoil can be reduced by lower velocity, everything else being equal.

Selection of Shotshell Loads

Shotshell loads in this data reference are listed in order of gauge, shell length, case type and shot weight.

For the reloader, no further explanation of his gauge or shell length is actually necessary.

Be certain to select the data for the exact case being loaded. Data is not interchangeable from one case type to another.

The desired shot weight is readily referenced from the factory ammunition used for various purposes.

The load velocity may require some additional explanation. Factory ammunition packages normally make no reference to velocity but rather to dram equivalent.

Winchester offers, for reference, the following dram equivalent table according to industry standards. For load selection, select the load that meets or most nearly meets the velocity of the dram equivalent of the load to be duplicated. In general, higher velocity will increase the effective range of a load while also increasing recoil.

| 10 Gauge | |
|--|----------|
| 3 1/2 " Shells | Velocity |
| 4 1/4 drams equivalent, 2 ounce shot | 1210 fps |
| 4 1/2 drams equivalent, 2 1/4 ounce shot | 1210 fps |

| 12 Gauge | |
|--|----------|
| 2 3/4 " Shells | Velocity |
| 2 3/4 drams equivalent, 1 ounce shot | 1180 fps |
| 3 1/4 drams equivalent, 1 ounce shot | 1290 fps |
| 2 3/4 drams equivalent, 1 1/8 ounce shot | 1145 fps |
| 3 drams equivalent, 1 1/8 ounce shot | 1200 fps |
| 3 1/4 drams equivalent, 1 1/8 ounce shot | 1255 fps |
| 3 1/4 drams equivalent, 1 1/4 ounce shot | 1220 fps |
| 3 1/2 drams equivalent, 1 1/8 ounce shot | 1300 fps |
| 3 3/4 drams equivalent, 1 1/4 ounce shot | 1330 fps |
| 3 3/4 drams equivalent, 1 1/2 ounce shot | 1260 fps |

| 3 " Shells | Velocity |
|--|----------|
| 3 3/4 drams equivalent, 1 3/8 ounce shot | 1295 fps |
| 4 drams equivalent, 1 5/8 ounce shot | 1280 fps |
| 4 drams equivalent, 1 7/8 ounce shot | 1210 fps |
| Max drams equivalent, 2 ounce shot | 1125 fps |

| 16 Gauge | |
|--|----------|
| 2 3/4 " Shells | Velocity |
| 2 1/2 drams equivalent, 1 ounce shot | 1165 fps |
| 2 3/4 drams equivalent, 1 1/8 ounce shot | 1185 fps |
| 3 drams equivalent, 1 1/8 ounce shot | 1240 fps |
| 3 1/4 drams equivalent, 1 1/8 ounce shot | 1295 fps |
| 3 1/4 drams equivalent, 1 1/4 ounce shot | 1260 fps |

| 20 Gauge | |
|--|----------|
| 2 3/4 " Shells | Velocity |
| 2 1/2 drams equivalent, 7/8 ounce shot | 1210 fps |
| 2 1/2 drams equivalent, 1 ounce shot | 1165 fps |
| 2 3/4 drams equivalent, 1 ounce shot | 1220 fps |
| 2 3/4 drams equivalent, 1 1/8 ounce shot | 1175 fps |

| 3 " Shells | Velocity |
|---|----------|
| 3 1/2 drams equivalent, 1 3/16 ounce shot | 1195 fps |
| 3 drams equivalent, 1 1/4 ounce shot | 1185 fps |

| 28 Gauge | |
|--|----------|
| 2 3/4 " Shells | Velocity |
| 2 drams equivalent, 3/4 ounce shot | 1200 fps |
| 2 1/4 drams equivalent, 3/4 ounce shot | 1295 fps |
| Max drams equivalent, 1 ounce shot | 1125 fps |

| 410 Bore | |
|---|----------|
| 2 1/2 " Shells | Velocity |
| Max. drams equivalent, 1/2 ounce shot | 1200 fps |
| 3 " Shells | Velocity |
| Max. drams equivalent, 11/16 ounce shot | 1135 fps |

The selection of shotshell loads can be further clarified by grouping, according to gauge, the weight of the shot charge and the velocity. These can be applied to general applications. Other specifications are of course possible.

| Shot Weight | Velocity | Application |
|---------------|----------|----------------|
| 10 Ga. 3 1/2" | | |
| All loads | 1210 fps | Magnum, turkey |

| 12 Ga. 2 3/4" | | |
|---------------|---------------|---------------------------|
| 7/8 oz. | 1200 fps | Light target |
| 1 oz. | 1150-1290 fps | Light target, light field |
| 1 1/8 oz. | 1145-1200 fps | Trap, skeet and field |
| 1 1/8 oz. | 1255-1400 fps | Field |
| 1 1/4 oz. | 1150-1305 fps | Field |
| 1 1/4 oz. | 1330 fps | Heavy field |
| 1 3/8 oz. | 1250-1295 fps | Heavy field |
| 1 3/8 oz. | 1330 fps | Magnum |
| 1 1/2 oz. | 1095 fps | Field |
| 1 1/2 oz. | 1240-1260 fps | Magnum, turkey |

| 12 Ga. 3" | | |
|-----------|---------------|-------------|
| 1 3/8 oz. | 1295 fps | Heavy field |
| 1 5/8 oz. | 1205 fps | Turkey |
| 1 7/8 oz. | 1100-1140 fps | Turkey |
| 2 oz. | 1125 fps | Turkey |

| 16 Ga. 2 3/4" | | |
|---------------|---------------|--------------------|
| 1 oz. | 1165-1220 fps | Trap, skeet, field |
| 1 1/8 oz. | 1185 fps | Trap, skeet, field |
| 1 1/8 oz. | 1240-1290 fps | Field |
| 1 1/4 oz. | 1230 fps | Field (magnum) |

| Shot Weight | Velocity | Application |
|---------------|---------------|----------------|
| 20 Ga. 2 3/4" | | |
| 3/4 oz. | 1145-1200 fps | Light target |
| 7/8 oz. | 1200 fps | Skeet, field |
| 1 oz. | 1165-1250 fps | Field |
| 1 1/8 oz. | 1150-1185 fps | Field (magnum) |

| 20 Ga. 3" | | |
|------------|---------------|-------|
| 1 1/8 oz. | 1220 fps | Field |
| 1 3/16 oz. | 1195 fps | Field |
| 1 1/4 oz. | 1135-1220 fps | Field |

| 28 Ga. 2 3/4" | | |
|---------------|----------|--------------|
| 3/4 oz. | 1200 fps | Skeet, field |
| 3/4 oz. | 1260 fps | Field |
| 1 oz. | 1125 fps | Field |

| 410 Bore | | |
|-----------------|---------------|------------------|
| All Loads | 1135-1200 fps | Skeet |
| 11/16 oz. Loads | 1135 fps | Very light field |

Winchester Lead Shot, Shotshell Loading Data

Do not substitute components. Use only combinations as listed in the data. The data herein supersedes all previous Winchester tabulations. All data was obtained in once fired cases.

Caution: Shotshell BALL POWDER smokeless propellants should always be used with primers having covered flash holes. Do not use the shotshell data contained in this handbook with steel shot; to do so would cause an extremely dangerous condition. See page 13.

Loads are listed for the following shotshell cases—

10 Gauge 3 1/2"

- Winchester polyformed plastic—paper basewad

12 Gauge 2 3/4"

- Winchester compression-formed, Double A, Upland, Xpert and Super-X
- Winchester and Sears polyformed plastic, low brass head- high paper basewads
- Winchester and Sears paper, low brass head- high paper basewad
- Winchester polyformed plastic basewad
- Remington-Peters SP plastic
- Remington-Peters RXP plastic
- Peters Blue Magic plastic
- Remington RTL
- Federal paper, low brass head- wound paper basewad
- Federal Gold Medal

12 Gauge 3"

- Winchester compression-formed, Super-X
- Remington-Peters SP plastic

16 Gauge 2 3/4"

- Winchester compression-formed, Upland, Xpert and Super-X

20 Gauge 2 3/4"

- Winchester compression-formed, Double A, Upland, Xpert and Super-X
- Remington-Peters SP plastic
- Remington-Peters RXP Plastic

20 Gauge 3"

- Winchester compression-formed, Super-X.
- Remington-Peters SP plastic.

28 Gauge 2 3/4"

- Winchester compression-formed, Double A and Super-X.

410 Bore 2 1/2"

- Winchester compression-formed, Double A and Super-X.
- Remington-Peters SP plastic (new style for 209 size primer).

410 Bore 3"

- Winchester compression-formed, Super-X.
- Remington-Peters SP plastic.

| Wads Used in Various Loads | | | | | | |
|----------------------------|---------|-----------|-------|-------|-------|---------|
| Winchester | | Remington | | | | Federal |
| WAA12 | WAA16 | SP10 | RXP12 | RP12 | PT28 | 121C |
| WAA12R | WAA20 | Fig 8 | R12L | SP16 | SP410 | 12C2 |
| WAA12F114 | WAA20F1 | TGT12 | R12H | RXP20 | | 1231 |
| WAA12SL | WAA28 | | SP12 | SP20 | | 410SC |
| | WAA41 | | | | | |

Winchester Case Identification



Winchester Compression-Formed Cases

The Double A case, the Xpert case, the Upland case, and the High Brass case-all are compression-formed-and are made of one piece of plastic without separate basewad.

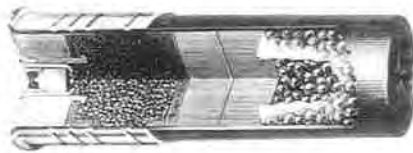
Regardless of whether the compression-formed case has high or low outside brass, it may be used for data listed for this case.

The internal dimensions of the Double A, the Upland case, Xpert and High Brass are identical.

All these cases now have an 8-fold crimp for improved reloadability.



Low Brass



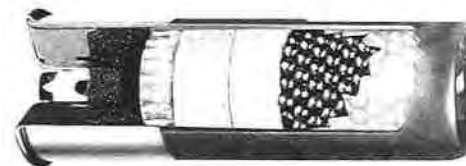
High Brass

Winchester Low Brass and High Brass Polyformed or Paper Cases

The internal length of the low brass shell is shorter than the internal length of the high brass polyformed plastic shell or paper shell.

These shells are made with a separate paper basewad (with overlay cup). In the low brass shell the basewad is thicker than in the high brass shell.

The data recommendations for use in the high brass and low brass polyformed or paper shotshell cases must be different because of the difference in the internal volumes.



Winchester 12 Ga. Polyformed Plastic Tube with Plastic Basewad

The Winchester Dove & Quail, Rabbit & Squirrel (low brass), and Pheasant (high brass) cases all use a plastic tube and plastic basewad.

Regardless of whether this case has high or low brass it may be used with data listed for this case.

The internal dimensions of these cases are identical.

Shotshell Data

| 10 Gauge 3 1/2" Case Winchester Polyformed Plastic | | | | | | |
|---|----------|--------|-----------------|---|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 2 oz. | Win. 209 | 540 | 44.0 | Rem. SP 10 with a 16 ga. 1/4" fiber filler | 1210 | 8,700 LUP |
| 2 oz. | Win. 209 | 540 | 44.0 | Pacific plastic with a 20 ga. 3/8" fiber filler | 1210 | 8,600 LUP |
| 2 1/4 oz. | Win. 209 | 571 | 47.0 | Rem. SP10 | 1210 | 9,900 LUP |
| 2 1/4 oz. | Win. 209 | 571 | 48.0 | Pacific Plastic | 1210 | 10,000 LUP |

| 12 Gauge 2 3/4" Case Winchester Compression-Formed, "Double A", "Xpert" and "Super-X" | | | | | | |
|--|-----------|--------|-----------------|--------------|----------------|-----------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 7/8 oz. | Win. 209 | 452AA | 19.0 | Win. WAA12SL | 1210 | 7,100 LUP |
| 1 oz. * | Win. 209 | WST | 19.5 | Win. WAA12SL | 1180 | 7,400 psi |
| 1 oz. | Win. 209 | WST | 19.0 | Fed. 12S0 | 1180 | 8,000 psi |
| 1 oz. | CCI 209 | WST | 19.0 | Fed. 12S0 | 1180 | 8,300 psi |
| 1 oz. | Fed. 209 | WST | 19.5 | Fed. 12S0 | 1180 | 7,900 psi |
| 1 oz. | Fed. 209A | WST | 19.0 | Win. WAA12SL | 1180 | 7,900 psi |
| 1 oz. | Win. 209 | 452AA | 20.0 | Win. WAA12SL | 1180 | 7,300 LUP |
| 1 oz. | Fed. 209 | 452AA | 20.0 | Win. WAA12SL | 1180 | 7,300 LUP |
| 1 oz. | CCI 209 | 452AA | 20.0 | Win. WAA12SL | 1180 | 6,800 LUP |
| 1 oz. | Win. 209 | WST | 21.0 | Win. WAA12SL | 1235 | 8,100 psi |
| 1 oz. | Win. 209 | WST | 20.5 | Fed. 12S0 | 1235 | 9,500 psi |
| 1 oz. | CCI 209 | WST | 21.5 | Win. WAA12SL | 1235 | 7,900 psi |
| 1 oz. | CCI 209 | WST | 20.5 | Fed. 12S0 | 1235 | 9,500 psi |
| 1 oz. | Fed. 209 | WST | 21.0 | Win. WAA12SL | 1235 | 7,400 psi |
| 1 oz. | Fed. 209 | WST | 21.0 | Fed. 12S0 | 1235 | 9,300 psi |
| 1 oz. | Fed. 209A | WST | 20.0 | Win. WAA12SL | 1235 | 8,900 psi |
| 1 oz. | Win. 209 | 452AA | 21.5 | Win. WAA12SL | 1235 | 7,900 LUP |
| 1 oz. | Fed. 209 | 452AA | 21.5 | Win. WAA12SL | 1235 | 7,800 LUP |
| 1 oz. | CCI 209 | 452AA | 21.5 | Win. WAA12SL | 1235 | 7,800 LUP |

• No Wad Pressure

* This load will duplicate the ballistics of the factory Winchester AA Xtra-Lite target load.

CAUTION: DO NOT INTERCHANGE FED 209 AND FED 209A PRIMERS

| 12 Gauge 2 3/4" Case Winchester Compression-Formed, "Double A", "Xpert" and "Super-X" (cont'd) | | | | | | |
|---|-----------|--------|-----------------|--------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 oz. | Win. 209 | WST | 22.0 | Win. WAA12SL | 1290 | 9,000 psi |
| 1 oz. | Win. 209 | WST | 22.0 | Fed. 12S0 | 1290 | 10,900 psi |
| 1 oz. | CCI 209 | WST | 22.5 | Win. WAA12SL | 1290 | 9,400 psi |
| 1 oz. | CCI 209 | WST | 21.5 | Fed. 12S0 | 1290 | 10,700 psi |
| 1 oz. | Fed. 209 | WST | 22.5 | Win. WAA12SL | 1290 | 8,400 psi |
| 1 oz. | Fed. 209 | WST | 22.5 | Fed. 12S0 | 1290 | 10,700 psi |
| 1 oz. | Fed. 209A | WST | 21.0 | Win. WAA12SL | 1290 | 9,800 psi |
| 1 oz. | Win. 209 | 452AA | 23.0 | Win. WAA12SL | 1290 | 8,900 LUP |
| 1 oz. | Fed. 209 | 452AA | 23.0 | Win. WAA12SL | 1290 | 8,600 LUP |
| 1 oz. | CCI 209 | 452AA | 23.0 | Win. WAA12SL | 1290 | 8,500 LUP |
| 1 oz. | Win. 209 | WSL | 21.0 | Win. WAA12SL | 1290 | 9,500 psi |
| 1 oz. | Win. 209 | WSL | 21.5 | Fed. 12S0 | 1290 | 10,100 psi |
| 1 oz. | CCI 209 | WSL | 21.0 | Win. WAA12SL | 1290 | 9,400 psi |
| 1 oz. | CCI 209 | WSL | 21.0 | Fed. 12S0 | 1290 | 10,400 psi |
| 1 oz. | Fed. 209 | WSL | 21.0 | Win. WAA12SL | 1290 | 9,300 psi |
| 1 oz. | Fed. 209 | WSL | 21.5 | Fed. 12S0 | 1290 | 9,600 psi |
| 1 oz. | Fed. 209A | WSL | 19.5 | Win. WAA12SL | 1290 | 10,300 psi |
| 1 1/8 oz. | Win. 209 | WSL | 18.5 | Win. WAA12SL | 1145 | 8,000 psi |
| 1 1/8 oz. | Win. 209 | WSL | 19.0 | Rem. Fig-8 | 1145 | 8,400 psi |
| 1 1/8 oz. | CCI 209 | WSL | 18.5 | Win. WAA12SL | 1145 | 8,800 psi |
| 1 1/8 oz. | CCI 209 | WSL | 18.5 | Rem. Fig-8 | 1145 | 8,500 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 18.5 | Win. WAA12SL | 1145 | 7,800 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 19.0 | Rem. RXP12 | 1145 | 8,000 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 19.0 | Rem. Fig-8 | 1145 | 8,200 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 19.0 | Fed. 12S3 | 1145 | 8,000 psi |
| 1 1/8 oz. | Fed. 209A | WSL | 17.0 | Win. WAA12SL | 1145 | 9,800 psi |
| 1 1/8 oz.* | Win. 209 | WST | 18.5 | Win. WAA12 | 1145 | 8,600 psi |
| 1 1/8 oz. | Win. 209 | WST | 19.0 | Rem. RXP12 | 1145 | 8,700 psi |
| 1 1/8 oz. | Win. 209 | WST | 19.0 | Rem. Fig-8 | 1145 | 8,400 psi |
| 1 1/8 oz. | Win. 209 | WST | 19.0 | Fed. 12S3 | 1145 | 9,800 psi |
| 1 1/8 oz. | CCI 209 | WST | 19.0 | Win. WAA12 | 1145 | 9,100 psi |
| 1 1/8 oz. | CCI 209 | WST | 19.5 | Rem. RXP12 | 1145 | 8,800 psi |
| 1 1/8 oz. | CCI 209 | WST | 19.0 | Rem. Fig-8 | 1145 | 9,000 psi |
| 1 1/8 oz. | CCI 209 | WST | 19.0 | Fed. 12S3 | 1145 | 9,500 psi |
| 1 1/8 oz. | Fed. 209 | WST | 19.0 | Win. WAA12 | 1145 | 9,000 psi |
| 1 1/8 oz. | Fed. 209 | WST | 19.5 | Rem. Fig-8 | 1145 | 8,100 psi |
| 1 1/8 oz. | Fed. 209 | WST | 19.5 | Fed. 12S3 | 1145 | 10,000 psi |
| 1 1/8 oz. | Fed. 209A | WST | 18.5 | Win. WAA12 | 1145 | 10,700 psi |
| 1 1/8 oz. | Fed. 209A | WSF | 21.5 | Win. WAA12SL | 1145 | 7,200 psi |
| 1 1/8 oz. | Win. 209 | 452AA | 19.5 | Win. WAA12 | 1145 | 9,400 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 19.5 | Rem. RXP12 | 1145 | 9,300 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 19.5 | Fed. 12C1 | 1145 | 9,000 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 19.5 | Fed. 12S1 | 1145 | 9,300 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 20.0 | Alcan D | 1145 | 9,000 LUP |
| 1 1/8 oz. | CCI 109 | 452AA | 19.0 | Win. WAA12 | 1145 | 9,600 LUP |
| 1 1/8 oz. | CCI 109 | 452AA | 19.0 | Rem. RXP12 | 1145 | 9,600 LUP |
| 1 1/8 oz. | CCI 109 | 452AA | 19.5 | Fed. 12S1 | 1145 | 9,700 LUP |
| 1 1/8 oz. | CCI 109 | 452AA | 19.5 | Fed. 12C1 | 1145 | 9,600 LUP |
| 1 1/8 oz. | CCI 109 | 452AA | 19.5 | Alcan D | 1145 | 9,000 LUP |
| 1 1/8 oz. | Fed. 209 | 452AA | 19.5 | Win. WAA12 | 1145 | 9,200 LUP |
| 1 1/8 oz. | Fed. 209 | 452AA | 19.5 | Rem. RXP12 | 1145 | 8,700 LUP |
| 1 1/8 oz. | Fed. 209 | 452AA | 19.5 | Fed. 12S1 | 1145 | 9,000 LUP |
| 1 1/8 oz. | Fed. 209 | 452AA | 20.0 | Fed. 12C1 | 1145 | 9,200 LUP |
| 1 1/8 oz. | Fed. 209 | 452AA | 20.0 | Alcan D | 1145 | 9,300 LUP |
| 1 1/8 oz. | Fed. 399 | 452AA | 20.0 | Win. WAA12 | 1145 | 9,100 LUP |
| 1 1/8 oz. | Fed. 399 | 452AA | 20.0 | Rem. RXP12 | 1145 | 8,800 LUP |
| 1 1/8 oz. | Fed. 399 | 452AA | 20.0 | Fed. 12C1 | 1145 | 9,600 LUP |
| 1 1/8 oz. | Fed. 399 | 452AA | 20.0 | Alcan D | 1145 | 9,500 LUP |
| 1 1/8 oz.** | Win. 209 | WST | 20.0 | Win. WAA12 | 1200 | 9,800 psi |
| 1 1/8 oz. | Win. 209 | WST | 20.0 | Rem. RXP12 | 1200 | 9,700 psi |
| 1 1/8 oz. | Win. 209 | WST | 20.5 | Rem. Fig-8 | 1200 | 10,000 psi |
| 1 1/8 oz. | Win. 209 | WST | 20.0 | Fed. 12S3 | 1200 | 10,900 psi |
| 1 1/8 oz. | CCI 209 | WST | 20.5 | Win. WAA12 | 1200 | 10,300 psi |
| 1 1/8 oz. | CCI 209 | WST | 20.5 | Rem. RXP12 | 1200 | 10,300 psi |
| 1 1/8 oz. | CCI 209 | WST | 20.5 | Rem. Fig-8 | 1200 | 10,000 psi |
| 1 1/8 oz. | CCI 209 | WST | 20.5 | Fed. 12S3 | 1200 | 10,800 psi |
| 1 1/8 oz. | Fed. 209 | WST | 20.5 | Win. WAA12 | 1200 | 10,000 psi |
| 1 1/8 oz. | Fed. 209 | WST | 20.5 | Rem. RXP12 | 1200 | 10,000 psi |
| 1 1/8 oz. | Fed. 209 | WST | 21.0 | Rem. RXP12 | 1200 | 10,000 psi |

* This load will duplicate the ballistics of the factory AA Winchester Light 2 3/4 dram eq. target load.

** This load will duplicate the ballistics of the factory AA Winchester Heavy 3 dram eq. target load.

CAUTION: DO NOT INTERCHANGE FED 209 AND FED 209A PRIMERS

| 12 Gauge 2 3/4" Case Winchester Compression-Formed, "Double A", "Xpert" and "Super-X" (cont'd) | | | | | | |
|---|-----------|--------|-----------------|-------------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 1/8 oz. | Fed. 209 | WST | 21.0 | Rem. Fig-8 | 1200 | 9,200 psi |
| 1 1/8 oz. | Fed. 209 | WST | 21.0 | Fed. 12S3 | 1200 | 10,900 psi |
| 1 1/8 oz. | Win. 209 | WSL | 20.0 | Win. WAA12SL | 1200 | 9,000 psi |
| 1 1/8 oz. | Win. 209 | WSL | 20.0 | Win. WAA12 | 1200 | 10,100 psi |
| 1 1/8 oz. | Win. 209 | WSL | 19.5 | Rem. RXP12 | 1200 | 9,800 psi |
| 1 1/8 oz. | Win. 209 | WSL | 20.0 | Rem. Fig-8 | 1200 | 9,400 psi |
| 1 1/8 oz. | Win. 209 | WSL | 20.0 | Fed. 12S3 | 1200 | 10,200 psi |
| 1 1/8 oz. | CCI 209 | WSL | 19.5 | Win. WAA12SL | 1200 | 9,800 psi |
| 1 1/8 oz. | CCI 209 | WSL | 19.5 | Win. WAA12 | 1200 | 10,800 psi |
| 1 1/8 oz. | CCI 209 | WSL | 19.5 | Rem. Fig-8 | 1200 | 9,700 psi |
| 1 1/8 oz. | CCI 209 | WSL | 19.5 | Rem. R12L | 1200 | 9,200 psi |
| 1 1/8 oz. | CCI 209 | WSL | 19.5 | Fed. 12S3 | 1200 | 10,400 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 20.0 | Win. WAA12SL | 1200 | 9,100 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 20.0 | Win. WAA12 | 1200 | 10,700 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 20.0 | Rem. RXP12 | 1200 | 9,700 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 20.0 | Rem. Fig-8 | 1200 | 9,600 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 20.0 | Fed. 12S3 | 1200 | 10,500 psi |
| 1 1/8 oz. | Fed. 209A | WSL | 18.5 | Win. WAA12SL | 1200 | 11,100 psi |
| 1 1/8 oz. | Fed. 209A | WSF | 23.0 | Win. WAA12SL | 1200 | 8,400 psi |
| 1 1/8 oz. | Win. 209 | 452AA | 20.5 | Win. WAA12 | 1200 | 10,100 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 21.0 | Rem. RXP12 | 1200 | 9,900 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 20.5 | Fed. 12S1 | 1200 | 10,200 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 21.0 | Fed. 12C1 | 1200 | 10,000 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 21.0 | Alcan D | 1200 | 10,000 LUP |
| 1 1/8 oz. | CCI 109 | 452AA | 20.5 | Win. WAA12 | 1200 | 10,500 LUP |
| 1 1/8 oz. | CCI 109 | 452AA | 20.5 | Rem. RXP12 | 1200 | 10,400 LUP |
| 1 1/8 oz. | CCI 109 | 452AA | 20.5 | Fed. 12S1 or 12C1 | 1200 | 10,400 LUP |
| 1 1/8 oz. | CCI 109 | 452AA | 20.5 | Alcan D | 1200 | 10,300 LUP |
| 1 1/8 oz. | Fed. 209 | 452AA | 20.5 | Win. WAA12 | 1200 | 10,000 LUP |
| 1 1/8 oz. | Fed. 209 | 452AA | 20.5 | Fed. 12S1 | 1200 | 9,900 LUP |
| 1 1/8 oz. | Fed. 209 | 452AA | 21.0 | Fed. 12C1 | 1200 | 9,900 LUP |
| 1 1/8 oz. | Fed. 209 | 452AA | 21.0 | Alcan D | 1200 | 9,900 LUP |
| 1 1/8 oz. | Fed. 399 | 452AA | 20.5 | Win. WAA12 | 1200 | 10,000 LUP |
| 1 1/8 oz. | Fed. 399 | 452AA | 21.5 | Rem. RXP12 | 1200 | 9,900 LUP |
| 1 1/8 oz. | Fed. 399 | 452AA | 21.0 | Fed. 12S1 | 1200 | 10,200 LUP |
| 1 1/8 oz. | Fed. 399 | 452AA | 21.0 | Fed. 12C1 | 1200 | 10,100 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 23.5 | Win. WAA12 | 1200 | 8,500 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 24.0 | Rem. RXP12 | 1200 | 8,200 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 24.0 | Fed. 12S1 or 12C1 | 1200 | 8,300 LUP |
| 1 1/8 oz. | CCI 109 | 473AA | 23.5 | Win. WAA12 | 1200 | 8,900 LUP |
| 1 1/8 oz. | CCI 109 | 473AA | 23.5 | Rem. RXP12 | 1200 | 8,400 LUP |
| 1 1/8 oz. | CCI 109 | 473AA | 23.5 | Fed. 12S1 | 1200 | 8,700 LUP |
| 1 1/8 oz. | CCI 109 | 473AA | 24.0 | Fed. 12C1 | 1200 | 8,500 LUP |
| 1 1/8 oz. | Fed. 209 | 473AA | 23.5 | Win. WAA12 | 1200 | 9,200 LUP |
| 1 1/8 oz. | Fed. 209 | 473AA | 23.5 | Rem. RXP12 | 1200 | 8,500 LUP |
| 1 1/8 oz. | Fed. 209 | 473AA | 23.5 | Fed. 12S1 or 12C1 | 1200 | 8,700 LUP |
| 1 1/8 oz. | Win. 209 | WSL | 21.5 | Win. WAA12SL | 1255 | 10,800 psi |
| 1 1/8 oz. | Win. 209 | WSL | 21.0 | Win. WAA12 | 1255 | 10,900 psi |
| 1 1/8 oz. | Win. 209 | WSL | 21.0 | Rem. RXP12 | 1255 | 10,900 psi |
| 1 1/8 oz. | Win. 209 | WSL | 21.0 | Rem. Fig-8 | 1255 | 10,800 psi |
| 1 1/8 oz. | Win. 209 | WSL | 21.5 | Rem. R12L | 1255 | 10,800 psi |
| 1 1/8 oz. | CCI 209 | WSL | 21.0 | Win. WAA12SL | 1255 | 10,900 psi |
| 1 1/8 oz. | CCI 209 | WSL | 21.0 | Rem. RXP12 | 1255 | 10,700 psi |
| 1 1/8 oz. | CCI 209 | WSL | 21.0 | Rem. Fig-8 | 1255 | 10,900 psi |
| 1 1/8 oz. | CCI 209 | WSL | 21.0 | Rem. R12L | 1255 | 10,600 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 21.5 | Win. WAA12SL | 1255 | 10,300 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 21.0 | Rem. RXP12 | 1255 | 10,700 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 21.5 | Rem. Fig-8 | 1255 | 10,900 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 21.5 | Rem. R12L | 1255 | 10,500 psi |
| 1 1/8 oz. | Fed. 209A | WSF | 24.0 | Win. WAA12SL | 1255 | 9,100 psi |
| 1 1/8 oz. | Win. 209 | 473AA | 25.0 | Win. WAA12 | 1255 | 9,500 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 25.0 | Rem. RXP12 | 1255 | 8,500 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 25.0 | Fed. 12S1 | 1255 | 9,100 LUP |
| 1 1/8 oz. | CCI 109 | 473AA | 24.5 | Win. WAA12 | 1255 | 9,400 LUP |
| 1 1/8 oz. | CCI 109 | 473AA | 25.0 | Rem. RXP12 | 1255 | 9,400 LUP |

CAUTION: DO NOT INTERCHANGE FED 209 AND FED 209A PRIMERS

| 12 Gauge 2 3/4" Case Winchester Compression-Formed, "Double A", "Xpert" and "Super-X" (cont'd) | | | | | | |
|---|-----------|--------|-----------------|----------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 1/8 oz. | CCI 109 | 473AA | 25.0 | Fed. 12S1 | 1255 | 9,900 LUP |
| 1 1/8 oz. | Fed. 209 | 473AA | 24.5 | Win. WAA12 | 1255 | 9,900 LUP |
| 1 1/8 oz. | Fed. 209 | 473AA | 25.0 | Rem. RXP12 | 1255 | 9,300 LUP |
| 1 1/8 oz. | Fed. 209 | 473AA | 25.0 | Fed. 12S1 | 1255 | 9,600 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 27.0 | Win. WAA12 | 1300 | 9,800 LUP |
| 1 1/8 oz. | Win. 209 | 540 | 32.5 | Win. WAA12 | 1300 | 9,200 LUP |
| 1 1/8 oz. | Win. 209 | WSF | 27.5 | Win. WAA12 | 1310 | 8,700 psi |
| 1 1/8 oz. | Win. 209 | WSF | 27.5 | Fed. 12S3 | 1310 | 8,500 psi |
| 1 1/8 oz. | Fed. 209A | WSF | 25.5 | Win. WAA12SL | 1310 | 9,800 psi |
| 1 1/8 oz. | Win. 209 | 473AA | 28.0 | Win. WAA12 | 1330 | 10,100 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 28.0 | Rem. RXP12 | 1330 | 10,100 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 28.0 | Fed. 12S1 | 1330 | 10,400 LUP |
| 1 1/8 oz. | CCI 109 | 473AA | 27.0 | Win. WAA12 | 1330 | 10,400 LUP |
| 1 1/8 oz. | CCI 109 | 473AA | 27.0 | Rem. RXP12 | 1330 | 10,100 LUP |
| 1 1/8 oz. | CCI 109 | 473AA | 27.0 | Fed. 12S1 | 1330 | 10,500 LUP |
| 1 1/8 oz. | Win. 209 | WSF | 29.0 | Win. WAA12 | 1365 | 9,900 psi |
| 1 1/8 oz. | Win. 209 | WSF | 28.5 | Fed. 12S3 | 1365 | 9,500 psi |
| 1 1/8 oz. | Win. 209 | WSF | 30.0 | Win. WAA12 | 1400 | 10,600 psi |
| 1 1/8 oz. | Win. 209 | WSF | 29.5 | Fed. 12S3 | 1400 | 10,800 psi |
| 1 1/8 oz. | Win. 209 | 540 | 35.0 | Win. WAA12 | 1400 | 10,000 LUP |
| 1 1/4 oz. | Win. 209 | 473AA | 23.5 | Win. WAA12 | 1150 | 9,400 LUP |
| 1 1/4 oz. | Win. 209 | 473AA | 23.5 | Win. WAA12F114 | 1150 | 9,500 LUP |
| 1 1/4 oz. | Win. 209 | 473AA | 23.5 | Rem. RXP12 | 1150 | 8,900 LUP |
| 1 1/4 oz. | Win. 209 | WSF | 26.0 | Fed. 12S4 | 1220 | 9,000 psi |
| 1 1/4 oz. | Win. 209 | 473AA | 25.0 | Win. WAA12 | 1220 | 10,300 LUP |
| 1 1/4 oz. | Win. 209 | 473AA | 25.0 | Win. WAA12F114 | 1220 | 10,100 LUP |
| 1 1/4 oz. | Win. 209 | 473AA | 25.0 | Rem. RXP12 | 1220 | 10,100 LUP |
| 1 1/4 oz. | Fed. 209 | 473AA | 25.0 | Win. WAA12 | 1220 | 10,500 LUP |
| 1 1/4 oz. | CCI 109 | 473AA | 24.5 | Win. WAA12 | 1220 | 9,800 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 31.5 | Win. WAA12 | 1220 | 9,000 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 30.0 | Win. WAA12F114 | 1220 | 8,500 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 31.5 | Rem. R12H | 1220 | 8,900 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 32.0 | Fed. 12C1 | 1220 | 8,800 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 33.0 | Win. WAA12 | 1255 | 9,100 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 31.0 | Win. WAA12F114 | 1255 | 9,100 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 33.0 | Rem. R12H | 1255 | 9,000 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 33.0 | Fed. 12C1 | 1255 | 9,100 LUP |
| 1 1/4 oz. | Win. 209 | WSF | 28.0 | Win. WAA12F114 | 1275 | 9,700 psi |
| 1 1/4 oz. | Win. 209 | WSF | 27.5 | Fed. 12S4 | 1275 | 10,900 psi |
| 1 1/4 oz. | CCI 209 | WSF | 29.0 | Rem. RXP12 | 1275 | 10,400 psi |
| 1 1/4 oz. | Fed. 209A | WSF | 27.0 | Win. WAA12F114 | 1310 | 10,700 psi |
| 1 1/4 oz.* | Win. 209 | WSF | 29.5 | Win. WAA12F114 | 1330 | 10,600 psi |
| 1 1/4 oz. | CCI 209 | WSF | 28.0 | Rem. SP12 | 1330 | 9,800 psi |
| 1 1/4 oz. | Win. 209 | 540 | 34.5 | Win. WAA12 | 1330 | 10,100 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 33.0 | Win. WAA12F114 | 1330 | 10,400 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 35.0 | Rem. R12H | 1330 | 10,300 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 35.0 | Fed. 12C1 | 1330 | 10,200 LUP |
| 1 1/4 oz. | CCI 109 | 540 | 34.5 | Win. WAA12 | 1330 | 10,500 LUP |
| 1 3/8 oz. | Fed. 209A | 571 | 32.0 | Win. WAA12R | 1215 | 11,000 psi |
| 1 3/8 oz. | Win. 209 | 540 | 32.0 | Win. WAA12F114 | 1275 | 10,300 LUP |
| 1 3/8 oz. | Win. 209 | 571 | 36.0 | Win. WAA12F114 | 1285 | 10,300 LUP |
| 1 3/8 oz. | Fed. 209 | 571 | 35.5 | Win. WAA12R | 1285 | 10,500 LUP |
| 1 3/8 oz. | Fed. 209 | 571 | 35.5 | Rem. RP12 | 1285 | 10,100 LUP |
| 1 1/2 oz. | Win. 209 | 540 | 27.5 | Win. WAA12R | 1095 | 8,500 LUP |
| 1 1/2 oz. | Win. 209 | 540 | 27.5 | Rem. RP12 | 1095 | 8,700 LUP |
| 1 1/2 oz. | Fed. 209 | 540 | 27.0 | Win. WAA12R | 1095 | 9,700 LUP |
| 1 1/2 oz. | Fed. 209 | 540 | 26.5 | Rem. RP12 | 1095 | 9,500 LUP |
| 1 1/2 oz. | Fed. 209A | 540 | 27.0 | Win. WAA12R | 1130 | 11,000 psi |
| 1 1/2 oz. | Win. 209 | 571 | 36.5 | Win. WAA12R | 1260 | 10,300 LUP |
| 1 1/2 oz. | Win. 209 | 571 | 36.5 | Rem. RP12 | 1260 | 9,800 LUP |
| 1 1/2 oz. | CCI 109 | 571 | 35.5 | Win. WAA12R | 1260 | 10,500 LUP |

*This load will duplicate the ballistics level of the factory Winchester 3 3/4 dram eq. Super-X Load

CAUTION: DO NOT INTERCHANGE FED 209 AND FED 209A PRIMERS

Shotshell

22

| 12 Gauge 2 3/4" Case Winchester Western and Sears Polyformed Plastic, Low Brass Head-High Paper Basewad | | | | | | |
|--|----------|--------|-----------------|------------|----------------|-----------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 oz. | Win. 209 | 452AA | 25.0 | Rem. R12L | 1290 | 8,100 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 21.5 | Rem. RPA12 | 1145 | 7,600 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 23.0 | Rem. RPA12 | 1200 | 8,900 LUP |

| 12 Gauge 2 3/4" Case Winchester Polyformed Plastic, Low or High Brass Head-Plastic Basewad | | | | | | |
|---|----------|--------|-----------------|-------------|----------------|-----------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 oz. | Win. 209 | 452AA | 23.0 | Fed. 12S3 | 1290 | 8,400 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 20.5 | Fed. 12S3 | 1145 | 7,500 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 35.0 | Rem. R12H | 1330 | 8,400 LUP |
| 1 1/2 oz. | Win. 209 | 540 | 33.5 | Win. WAA12R | 1260 | 8,900 LUP |

| 12 Gauge 2 3/4" Case Winchester and Sears Paper, Low Brass Head-High Paper Basewad | | | | | | |
|---|----------|--------|-----------------|-------------|----------------|-----------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 1/8 oz.* | Win. 209 | 452AA | 21.0 | Win. WAA12R | 1145 | 8,600 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 21.0 | Rem. RPA12 | 1145 | 8,600 LUP |
| 1 1/8 oz.** | Win. 209 | 452AA | 22.5 | Win. WAA12R | 1200 | 9,200 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 22.5 | Rem. RPA12 | 1200 | 9,600 LUP |

*This load will duplicate the ballistics level of the factory Winchester 2 3/4 dram eq. Target Load

**This load will duplicate the ballistics level of the factory Winchester 3 dram eq. Target Load

| 12 Gauge 2 3/4" Case Remington-Peters "SP" Plastic | | | | | | |
|---|---------|--------|-----------------|-----------------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 oz. | CCI 157 | 452AA | 23.5 | Win. WAA12 | 1290 | 9,800 LUP |
| 1 oz. | CCI 157 | 452AA | 23.5 | Rem. R12L | 1290 | 9,700 LUP |
| 1 oz. | CCI 157 | 452AA | 23.5 | Fed. 12S1 | 1290 | 10,200 LUP |
| 1 1/8 oz. | CCI 157 | 452AA | 19.5 | Win. WAA12 | 1145 | 9,200 LUP |
| 1 1/8 oz. | CCI 157 | 452AA | 19.5 | Rem. R12H | 1145 | 9,100 LUP |
| 1 1/8 oz. | CCI 157 | 452AA | 19.5 | Fed. 12S1 | 1145 | 9,600 LUP |
| 1 1/8 oz. | CCI 157 | 452AA | 21.5 | Win. WAA12 | 1200 | 10,200 LUP |
| 1 1/8 oz. | CCI 157 | 452AA | 21.5 | Rem. R12H | 1200 | 10,300 LUP |
| 1 1/8 oz. | CCI 157 | 452AA | 21.0 | Fed. 12S1 | 1200 | 10,400 LUP |
| 1 1/8 oz. | CCI 157 | 473AA | 24.5 | Rem. R12H | 1200 | 7,700 LUP |
| 1 1/8 oz. | CCI 157 | 473AA | 26.0 | Rem. R12H | 1255 | 8,800 LUP |
| 1 1/8 oz. | CCI 157 | 473AA | 28.5 | Rem. R12H | 1330 | 9,400 LUP |
| 1 1/4 oz. | CCI 157 | 540 | 32.0 | Rem. R12H | 1220 | 7,800 LUP |
| 1 1/4 oz. | CCI 157 | 540 | 33.0 | Rem. R12H | 1255 | 8,100 LUP |
| 1 1/4 oz. | CCI 157 | 540 | 36.0 | Pacific Blue Verelite | 1330 | 9,200 LUP |
| 1 3/8 oz. | CCI 157 | 540 | 35.5 | Rem. RP12 | 1295 | 9,300 LUP |
| 1 1/2 oz. | CCI 157 | 540 | 35.0 | Win. WAA12R | 1260 | 10,300 LUP |
| 1 1/2 oz. | CCI 157 | 540 | 35.0 | Rem. RP12 | 1260 | 10,100 LUP |

CAUTION: DO NOT INTERCHANGE FED 209 AND FED 209A PRIMERS

23

Shotshell

| 12 Gauge 2 3/4" Case Remington-Peters "RXP" Plastic | | | | | | |
|--|----------|--------|-----------------|----------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 oz. | Win. 209 | 452AA | 22.5 | Win. WAA12 | 1290 | 10,300 LUP |
| 1 oz. | Win. 209 | 452AA | 22.5 | Rem. R12L | 1290 | 10,100 LUP |
| 1 oz. | Win. 209 | 452AA | 22.5 | Fed 12S1 | 1290 | 10,300 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 19.5 | Win. WAA12 | 1145 | 9,700 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 19.5 | Win. WAA12XW | 1145 | 10,000 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 19.5 | Rem. RXP12 | 1145 | 9,600 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 19.5 | Fed. 12S1 | 1145 | 9,900 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 21.0 | Win. WAA12 | 1200 | 10,500 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 21.0 | Rem. RXP12 | 1200 | 10,400 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 23.5 | Win. WAA12 | 1200 | 8,600 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 23.5 | Win. WAA12XW | 1200 | 8,600 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 24.0 | Rem. RXP12 | 1200 | 8,400 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 23.5 | Fed. 12S1 | 1200 | 8,500 LUP |
| 1 1/8 oz. | CCI 109 | 473AA | 23.0 | Win. WAA12 | 1200 | 9,000 LUP |
| 1 1/8 oz. | CCI 109 | 473AA | 23.0 | Win. WAA12XW | 1200 | 9,600 LUP |
| 1 1/8 oz. | CCI 109 | 473AA | 23.5 | Rem. RXP12 | 1200 | 8,300 LUP |
| 1 1/8 oz. | CCI 109 | 473AA | 23.0 | Fed. 12S1 | 1200 | 8,700 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 25.0 | Win. WAA12 | 1255 | 9,600 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 25.5 | Rem. RXP12 | 1255 | 9,700 LUP |
| 1 1/8 oz. | Win. 209 | 540 | 33.0 | Rem. RXP12 | 1255 | 8,500 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 27.5 | Win. WAA12 | 1330 | 9,900 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 27.5 | Rem. RXP12 | 1330 | 10,500 LUP |
| 1 1/4 oz. | Win. 209 | 473AA | 25.0 | Win. WAA12 | 1220 | 10,300 LUP |
| 1 1/4 oz. | Win. 209 | 473AA | 25.0 | Rem. RXP12 | 1220 | 10,400 LUP |
| 1 1/4 oz. | Win. 209 | 473AA | 25.0 | Fed. 12C1 | 1220 | 10,300 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 29.0 | Win. WAA12F114 | 1220 | 8,900 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 30.0 | Win. WAA12F114 | 1255 | 9,600 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 31.0 | Win. WAA12F114 | 1305 | 10,300 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 33.5 | Win. WAA12 | 1330 | 10,300 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 34.5 | Rem. RXP12 | 1330 | 9,700 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 33.5 | Fed. 12S1 | 1330 | 10,000 LUP |
| 1 3/8 oz. | Win. 209 | 571 | 34.0 | Win. WAA12F114 | 1250 | 10,500 LUP |
| 1 3/8 oz. | Win. 209 | 540 | 33.0 | Win. WAA12R | 1275 | 10,200 LUP |
| 1 3/8 oz. | Win. 209 | 540 | 32.5 | Rem. RP12 | 1275 | 10,500 LUP |
| 1 3/8 oz. | Win. 209 | 571 | 37.5 | Win. WAA12R | 1295 | 10,100 LUP |
| 1 3/8 oz. | Win. 209 | 571 | 37.5 | Rem. RP12 | 1295 | 10,000 LUP |
| 1 1/2 oz. | Win. 209 | 571 | 36.5 | Rem. RP12 | 1240 | 10,400 LUP |

| 12 Gauge 2 3/4" Case Remington RTL Hull | | | | | | |
|---|----------|--------|-----------------|--------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 oz. | Win. 209 | WST | 19.0 | Fed. 12S0 | 1180 | 8,200 psi |
| 1 oz. | CCI 209 | WST | 19.0 | Win. WAA12SL | 1180 | 8,000 psi |
| 1 oz. | CCI 209 | WST | 18.5 | Fed. 12S0 | 1180 | 8,800 psi |
| 1 oz. | Fed. 209 | WST | 19.0 | Win. WAA12SL | 1180 | 8,100 psi |
| 1 oz. | Fed. 209 | WST | 19.0 | Fed. 12S0 | 1180 | 8,500 psi |
| 1 oz. | Win. 209 | WST | 19.5 | Win. WAA12SL | 1235 | 8,000 psi |
| 1 oz. | Win. 209 | WST | 20.0 | Fed. 12S0 | 1235 | 8,900 psi |
| 1 oz. | CCI 209 | WST | 20.0 | Win. WAA12SL | 1235 | 9,000 psi |
| 1 oz. | CCI 209 | WST | 19.5 | Fed. 12S0 | 1235 | 9,800 psi |
| 1 oz. | Fed. 209 | WST | 20.5 | Win. WAA12SL | 1235 | 9,000 psi |
| 1 oz. | Fed. 209 | WST | 20.0 | Fed. 12S0 | 1235 | 9,700 psi |
| 1 oz. | Win. 209 | WST | 21.0 | Win. WAA12SL | 1290 | 10,000 psi |
| 1 oz. | Win. 209 | WST | 21.0 | Fed. 12S0 | 1290 | 9,700 psi |
| 1 oz. | CCI 209 | WST | 21.0 | Win. WAA12SL | 1290 | 10,100 psi |
| 1 oz. | CCI 209 | WST | 20.5 | Fed. 12S0 | 1290 | 10,800 psi |
| 1 oz. | Fed. 209 | WST | 21.5 | Win. WAA12SL | 1290 | 9,700 psi |
| 1 oz. | Fed. 209 | WST | 21.0 | Fed. 12S0 | 1290 | 10,900 psi |

CAUTION: DO NOT INTERCHANGE FED 209 AND FED 209A PRIMERS

Shotshell

24

| 12 Gauge 2 3/4" Case Remington RTL Hull (cont'd.) | | | | | | |
|--|----------|--------|-----------------|----------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 oz. | Win. 209 | WSL | 20.5 | Win. WAA12SL | 1290 | 10,100 psi |
| 1 oz. | Win. 209 | WSL | 21.0 | Fed. 12S0 | 1290 | 9,800 psi |
| 1 oz. | CCI 209 | WSL | 20.5 | Win. WAA12SL | 1290 | 10,800 psi |
| 1 oz. | CCI 209 | WSL | 21.0 | Fed. 12S0 | 1290 | 10,300 psi |
| 1 oz. | Fed. 209 | WSL | 20.5 | Win. WAA12SL | 1290 | 10,100 psi |
| 1 oz. | Fed. 209 | WSL | 21.0 | Fed. 12S0 | 1290 | 9,700 psi |
| 1 1/8 oz. | Win. 209 | WSL | 18.5 | Win. WAA12 | 1145 | 8,300 psi |
| 1 1/8 oz. | CCI 209 | WSL | 18.0 | Win. WAA12 | 1145 | 8,900 psi |
| 1 1/8 oz. | CCI 209 | WSL | 18.0 | Fed. 12S3 | 1145 | 8,600 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 18.5 | Win. WAA12SL | 1145 | 8,000 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 18.0 | Win. WAA12 | 1145 | 8,500 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 18.5 | Fed. 12S3 | 1145 | 8,300 psi |
| 1 1/8 oz. | Win. 209 | WST | 19.0 | Rem. RXP12 | 1145 | 10,500 psi |
| 1 1/8 oz. | Win. 209 | WST | 19.0 | Rem. Fig-8 | 1145 | 10,400 psi |
| 1 1/8 oz. | CCI 209 | WST | 18.0 | Win. WAA12 | 1145 | 10,800 psi |
| 1 1/8 oz. | CCI 209 | WST | 18.5 | Rem. RXP12 | 1145 | 10,800 psi |
| 1 1/8 oz. | CCI 209 | WST | 18.5 | Rem. Fig-8 | 1145 | 10,200 psi |
| 1 1/8 oz. | Fed. 209 | WST | 18.5 | Rem. RXP12 | 1145 | 10,000 psi |
| 1 1/8 oz. | Fed. 209 | WST | 18.5 | Rem. Fig-8 | 1145 | 10,000 psi |
| 1 1/8 oz. | Win. 209 | WSL | 19.5 | Win. WAA12SL | 1200 | 9,400 psi |
| 1 1/8 oz. | Win. 209 | WSL | 19.5 | Win. WAA12 | 1200 | 9,700 psi |
| 1 1/8 oz. | Win. 209 | WSL | 19.5 | Rem. RXP12 | 1200 | 9,500 psi |
| 1 1/8 oz. | Win. 209 | WSL | 19.5 | Rem. Fig-8 | 1200 | 9,400 psi |
| 1 1/8 oz. | Win. 209 | WSL | 19.5 | Fed. 12S3 | 1200 | 10,200 psi |
| 1 1/8 oz. | CCI 209 | WSL | 19.0 | Win. WAA12SL | 1200 | 9,800 psi |
| 1 1/8 oz. | CCI 209 | WSL | 19.0 | Win. WAA12 | 1200 | 10,800 psi |
| 1 1/8 oz. | CCI 209 | WSL | 19.0 | Rem. RXP12 | 1200 | 10,000 psi |
| 1 1/8 oz. | CCI 209 | WSL | 19.0 | Rem. Fig-8 | 1200 | 9,600 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 20.0 | Win. WAA12SL | 1200 | 9,000 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 19.0 | Win. WAA12 | 1200 | 8,700 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 19.5 | Rem. RXP12 | 1200 | 8,800 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 20.0 | Rem. Fig-8 | 1200 | 8,100 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 19.0 | Fed. 12S3 | 1200 | 9,200 psi |
| 1 1/8 oz. | Win. 209 | WSL | 20.5 | Win. WAA12SL | 1255 | 10,600 psi |
| 1 1/8 oz. | Win. 209 | WSL | 20.5 | Win. WAA12 | 1255 | 10,900 psi |
| 1 1/8 oz. | Win. 209 | WSL | 20.5 | Rem. RXP12 | 1255 | 10,500 psi |
| 1 1/8 oz. | Win. 209 | WSL | 20.5 | Rem. Fig-8 | 1255 | 10,700 psi |
| 1 1/8 oz. | CCI 209 | WSL | 20.0 | Win. WAA12SL | 1255 | 10,900 psi |
| 1 1/8 oz. | CCI 209 | WSL | 20.0 | Rem. RXP12 | 1255 | 10,900 psi |
| 1 1/8 oz. | CCI 209 | WSL | 20.0 | Rem. Fig-8 | 1255 | 10,600 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 21.0 | Win. WAA12SL | 1255 | 10,400 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 20.5 | Win. WAA12 | 1255 | 9,900 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 21.0 | Rem. RXP12 | 1255 | 9,900 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 21.0 | Rem. Fig-8 | 1255 | 9,180 psi |
| 1 1/8 oz. | Fed. 209 | WSL | 20.5 | Fed. 12S3 | 1255 | 10,400 psi |
| 1 1/8 oz. | Win. 209 | WSF | 27.0 | Win. WAA12 | 1310 | 9,700 psi |
| 1 1/8 oz. | Win. 209 | WSF | 28.5 | Win. WAA12 | 1365 | 10,700 psi |
| 1 1/8 oz. | Win. 209 | WSF | 28.0 | Fed. 12S3 | 1365 | 8,900 psi |
| 1 1/8 oz. | Win. 209 | WSF | 29.0 | Fed. 12S3 | 1400 | 9,500 psi |
| 1 1/4 oz. | Fed. 209 | WSF | 26.5 | Win. WAA12F114 | 1220 | 8,800 psi |
| 1 1/4 oz. | CCI 209 | WSF | 25.5 | Win. WAA12F114 | 1220 | 9,100 psi |
| 1 1/4 oz. | Win. 209 | WSF | 27.5 | Win. WAA12F114 | 1275 | 9,700 psi |
| 1 1/4 oz. | Fed. 209 | WSF | 28.0 | Win. WAA12F114 | 1275 | 9,500 psi |
| 1 1/4 oz. | Fed. 209 | WSF | 28.0 | Rem. RXP12 | 1275 | 9,500 psi |
| 1 1/4 oz. | CCI 209 | WSF | 27.0 | Win. WAA12F114 | 1275 | 10,200 psi |
| 1 1/4 oz. | Win. 209 | WSF | 29.5 | Win. WAA12F114 | 1330 | 10,400 psi |
| 1 1/4 oz. | Fed. 209 | WSF | 29.5 | Win. WAA12F114 | 1330 | 10,200 psi |
| 1 1/4 oz. | Fed. 209 | WSF | 29.5 | Rem. RXP12 | 1330 | 10,700 psi |
| 1 1/4 oz. | CCI 209 | WSF | 28.5 | Win. WAA12F114 | 1330 | 10,900 psi |

CAUTION: DO NOT INTERCHANGE FED 209 AND FED 209A PRIMERS

25

Shotshell

| 12 Gauge 2 3/4" Case Peters "Blue Magic" Plastic | | | | | | |
|---|----------|--------|-----------------|--------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 oz. | Win. 209 | 452AA | 20.5 | Win. WAA12SL | 1180 | 6,600 LUP |
| 1 oz. | Fed. 209 | 452AA | 20.5 | Win. WAA12SL | 1180 | 6,700 LUP |
| 1 oz. | Win. 209 | 452AA | 21.5 | Win. WAA12SL | 1235 | 7,500 LUP |
| 1 oz. | Fed. 209 | 452AA | 21.5 | Win. WAA12SL | 1235 | 7,500 LUP |
| 1 oz. | Win. 209 | 452AA | 23.0 | Win. WAA12SL | 1290 | 8,400 LUP |
| 1 oz. | Fed. 209 | 452AA | 23.0 | Win. WAA12SL | 1290 | 8,100 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 19.5 | Win. WAA12 | 1145 | 10,100 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 20.0 | Rem. RXP12 | 1145 | 9,200 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 20.5 | Fed. 12S1 | 1145 | 9,000 LUP |
| 1 1/8 oz. | CCI 209 | 452AA | 18.5 | Win. WAA12 | 1145 | 9,500 LUP |
| 1 1/8 oz. | CCI 209 | 452AA | 19.5 | Rem. RXP12 | 1145 | 8,700 LUP |
| 1 1/8 oz. | CCI 209 | 452AA | 19.5 | Fed. 12S1 | 1145 | 8,500 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 21.5 | Rem. RXP12 | 1200 | 10,400 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 21.5 | Fed. 12S1 | 1200 | 9,800 LUP |
| 1 1/8 oz. | CCI 209 | 452AA | 20.0 | Win. WAA12 | 1200 | 10,400 LUP |
| 1 1/8 oz. | CCI 209 | 452AA | 20.5 | Rem. RXP12 | 1200 | 9,800 LUP |
| 1 1/8 oz. | CCI 209 | 452AA | 21.0 | Fed. 12S1 | 1200 | 9,200 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 24.0 | Win. WAA12 | 1200 | 8,500 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 24.0 | Rem. RXP12 | 1200 | 7,800 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 25.0 | Win. WAA12 | 1255 | 9,400 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 25.5 | Rem. RXP12 | 1255 | 9,100 LUP |
| 1 1/8 oz. | Win. 209 | 473AA | 26.5 | Rem. RXP12 | 1290 | 9,500 LUP |
| 1 1/4 oz. | Win. 209 | 473AA | 25.5 | Win. WAA12 | 1220 | 10,500 LUP |
| 1 1/4 oz. | Win. 209 | 473AA | 26.0 | Rem. RXP12 | 1220 | 10,300 LUP |
| 1 1/4 oz. | Win. 209 | 540 | 36.0 | Rem. RXP12 | 1330 | 10,400 LUP |
| 1 3/8 oz. | Win. 209 | 571 | 38.5 | Win. WAA12R | 1330 | 10,000 LUP |
| 1 3/8 oz. | Win. 209 | 571 | 38.0 | Rem. SP12 | 1330 | 10,400 LUP |
| 1 1/2 oz. | Win. 209 | 571 | 35.5 | Win. WAA12R | 1230 | 10,400 LUP |
| 1 1/2 oz. | Win. 209 | 571 | 36.0 | Rem. RP12 | 1230 | 10,400 LUP |

| 12 Gauge 2 3/4" Case Federal Paper, Low Brass Head-Wound Paper Basewad | | | | | | |
|---|----------|--------|-----------------|------------|----------------|-----------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 1/8 oz. | Win. 209 | 452AA | 20.5 | Win. WAA12 | 1145 | 8,700 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 21.0 | Fed. 12C1 | 1145 | 8,500 LUP |
| 1 1/8 oz. | Fed. 209 | 452AA | 21.0 | Fed. 12C1 | 1145 | 8,300 LUP |
| 1 1/8 oz. | Fed. 209 | 452AA | 20.5 | Fed. 12S3 | 1145 | 8,200 LUP |
| 1 1/8 oz. | Fed. 399 | 452AA | 21.0 | Fed. 12C1 | 1145 | 7,800 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 22.0 | Win. WAA12 | 1200 | 9,900 LUP |
| 1 1/8 oz. | Win. 209 | 452AA | 22.5 | Fed. 12C1 | 1200 | 9,600 LUP |
| 1 1/8 oz. | Fed. 209 | 452AA | 22.5 | Fed. 12C1 | 1200 | 9,300 LUP |
| 1 1/8 oz. | Fed. 209 | 452AA | 22.0 | Fed. 12S3 | 1200 | 9,200 LUP |
| 1 1/8 oz. | Fed. 399 | 452AA | 22.5 | Fed. 12C1 | 1200 | 9,200 LUP |

| 12 Gauge 2 3/4" Case Federal Gold Medal Hull | | | | | | |
|---|----------|--------|-----------------|------------|----------------|-----------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 oz. | Win. 209 | WST | 20.5 | Fed. 12S0 | 1180 | 7,400 psi |
| 1 oz. | Win. 209 | WST | 22.0 | Fed. 12S0 | 1235 | 8,500 psi |
| 1 oz. | CCI 209 | WST | 21.0 | Fed. 12S0 | 1235 | 8,500 psi |
| 1 oz. | Win. 209 | WST | 23.0 | Fed. 12S0 | 1290 | 9,300 psi |
| 1 oz. | CCI 209 | WST | 22.5 | Fed. 12S0 | 1290 | 9,500 psi |
| 1 oz. | Fed. 209 | WST | 23.0 | Fed. 12S0 | 1290 | 8,400 psi |

CAUTION: DO NOT INTERCHANGE FED 209 AND FED 209A PRIMERS

| 12 Gauge 2 3/4" Case Federal Gold Medal Hull (cont'd.) | | | | | | |
|---|----------|--------|-----------------|------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 1/8 oz. | CCI 209 | WST | 19.5 | Fed. 12S3 | 1145 | 8,500 psi |
| 1 1/8 oz. | Fed. 209 | WST | 20.0 | Fed. 12S3 | 1145 | 7,700 psi |
| 1 1/8 oz. | Win. 209 | WST | 21.0 | Fed. 12S3 | 1200 | 9,500 psi |
| 1 1/8 oz. | CCI 209 | WST | 21.0 | Fed. 12S3 | 1200 | 10,300 psi |
| 1 1/8 oz. | Fed. 209 | WST | 21.5 | Fed. 12S3 | 1200 | 9,000 psi |
| 1 1/4 oz. | CCI 209 | WSF | 27.0 | Fed. 12S4 | 1275 | 9,200 psi |
| 1 1/4 oz. | Win. 209 | WSF | 31.5 | Fed. 12S4 | 1330 | 9,500 psi |
| 1 1/4 oz. | CCI 209 | WSF | 29.5 | Fed. 12S4 | 1330 | 10,600 psi |

| 12 Gauge 3" Case Winchester Compression-Formed, "Super-X" | | | | | | |
|--|----------|--------------------|--------------------|-------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 3/8 oz. | Win. 209 | 540 | 35.0 | Win. WAA12 | 1295 | 9,500 LUP |
| 1 3/8 oz. | Win. 209 | 540 | 35.5 | Rem. R12L | 1295 | 9,500 LUP |
| 1 5/8 oz. | Win. 209 | 571 | 36.0 | Win. WAA12 | 1205 | 10,500 LUP |
| 1 5/8 oz. | Win. 209 | 571 | 36.0 | Rem. R12H | 1205 | 10,100 LUP |
| 1 7/8 oz. | Win. 209 | 571 | 33.0 | Win. WAA12R | 1100 | 10,500 LUP |
| 1 7/8 oz. | Win. 209 | 571 HST | 33.0 35 | Rem. RP12 | 1100 | 10,100 LUP |

| 12 Gauge 3" Case Remington-Peters "SP" Plastic | | | | | | |
|---|---------|--------|-----------------|-------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 3/8 oz. | CCI 157 | 540 | 36.0 | Win. WAA12 | 1295 | 9,800 LUP |
| 1 3/8 oz. | CCI 157 | 540 | 37.0 | Rem. R12L | 1295 | 9,100 LUP |
| 1 7/8 oz. | CCI 157 | 571 | 36.0 | Win. WAA12R | 1140 | 10,500 LUP |
| 1 7/8 oz. | CCI 157 | 571 | 36.0 | Rem. RP12 | 1140 | 10,500 LUP |

| 16 Gauge 2 3/4" Case Winchester Compression-Formed, "Xpert", "Super-X" and Promotional Game Loads with Integral Basewad | | | | | | |
|---|----------|--------|-----------------|------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 oz.* | Win. 209 | WSF | 20.0 | Win. WAA16 | 1165 | 8,400 psi |
| 1 oz. | Win. 209 | 540 | 23.0 | Win. WAA16 | 1165 | 8,700 psi |
| 1 oz. | Fed. 209 | 540 | 22.5 | Win. WAA16 | 1165 | 8,700 psi |
| 1 oz. | CCI 209 | 540 | 23.5 | Win. WAA16 | 1165 | 8,300 psi |
| 1 oz. | Win. 209 | 571 | 25.0 | Win. WAA16 | 1165 | 8,500 psi |
| 1 oz. | Fed. 209 | 571 | 25.0 | Win. WAA16 | 1165 | 8,500 psi |
| 1 oz. | CCI 209 | 571 | 25.0 | Win. WAA16 | 1165 | 8,400 psi |
| 1 oz. | Win. 209 | 452AA | 17.5 | Rem. SP16 | 1165 | 10,300 LUP |
| 1 oz. | CCI 109 | 452AA | 17.5 | Rem. SP16 | 1165 | 10,500 LUP |
| 1 oz. | Win. 209 | 473AA | 20.5 | Rem. SP16 | 1165 | 8,300 LUP |
| 1 oz. | CCI 109 | 473AA | 20.0 | Rem. SP16 | 1165 | 8,700 LUP |
| 1 oz. | Win. 209 | WSF | 21.0 | Win. WAA16 | 1220 | 9,000 psi |
| 1 oz. | Fed. 209 | WSF | 21.5 | Win. WAA16 | 1220 | 8,600 psi |
| 1 oz. | CCI 209 | WSF | 21.0 | Win. WAA16 | 1220 | 8,800 psi |
| 1 oz. | Win. 209 | 540 | 24.0 | Win. WAA16 | 1220 | 9,500 psi |
| 1 oz. | Fed. 209 | 540 | 24.0 | Win. WAA16 | 1220 | 9,500 psi |
| 1 oz. | CCI 209 | 540 | 24.5 | Win. WAA16 | 1220 | 9,000 psi |
| 1 oz. | Win. 209 | 571 | 26.5 | Win. WAA16 | 1220 | 9,300 psi |
| 1 oz. | Fed. 209 | 571 | 26.0 | Win. WAA16 | 1220 | 9,400 psi |
| 1 oz. | CCI 209 | 571 | 26.5 | Win. WAA16 | 1220 | 9,100 psi |
| 1 oz. | Win. 209 | 473AA | 21.5 | Rem. SP16 | 1220 | 8,800 LUP |
| 1 oz. | CCI 109 | 473AA | 21.0 | Rem. SP16 | 1220 | 9,000 LUP |

*This load will duplicate the ballistics of the factory Winchester 2 1/2 dram eq. Promotional Field Load

CAUTION: DO NOT INTERCHANGE FED 209 AND FED 209A PRIMERS

| 16 Gauge 2 3/4" Case Winchester Compression-Formed, "Xpert", "Super-X", and Promotional Game Loads (cont'd.) | | | | | | |
|--|----------|--------|-----------------|------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 1/8 oz. | CCI 209 | WSF | 20.5 | Win. WAA16 | 1185 | 10,800 psi |
| 1 1/8 oz. | Win. 209 | 540 | 24.5 | Win. WAA16 | 1185 | 10,900 psi |
| 1 1/8 oz. | Fed. 209 | 540 | 24.0 | Win. WAA16 | 1185 | 10,500 psi |
| 1 1/8 oz. | CCI 209 | 540 | 24.5 | Win. WAA16 | 1185 | 10,400 psi |
| 1 1/8 oz. | Win. 209 | 571 | 26.0 | Win. WAA16 | 1185 | 10,200 psi |
| 1 1/8 oz. | Fed. 209 | 571 | 25.5 | Win. WAA16 | 1185 | 10,200 psi |
| 1 1/8 oz. | CCI 209 | 571 | 26.0 | Win. WAA16 | 1185 | 10,000 psi |
| 1 1/8 oz. | Win. 209 | 540 | 26.5 | Rem. SP16 | 1185 | 8,800 LUP |
| 1 1/8 oz. | CCI 109 | 540 | 26.5 | Rem. SP16 | 1185 | 8,500 LUP |
| 1 1/8 oz. | Win. 209 | 571 | 27.0 | Win. WAA16 | 1240 | 10,900 psi |
| 1 1/8 oz. | Fed. 209 | 571 | 26.5 | Win. WAA16 | 1240 | 10,900 psi |
| 1 1/8 oz. | CCI 209 | 571 | 27.5 | Win. WAA16 | 1240 | 10,800 psi |
| 1 1/8 oz. | Win. 209 | 540 | 27.5 | Rem. SP16 | 1240 | 9,400 LUP |
| 1 1/8 oz. | CCI 109 | 540 | 27.5 | Rem. SP16 | 1240 | 9,200 LUP |
| 1 1/8 oz. | Win. 209 | 540 | 28.5 | Rem. SP16 | 1290 | 10,300 LUP |
| 1 1/8 oz. | CCI 109 | 540 | 28.5 | Rem. SP16 | 1290 | 9,600 LUP |
| 1 1/4 oz. | Win. 209 | 571 | 30.5 | Rem. SP16 | 1230 | 10,500 LUP |

| 20 Gauge 2 3/4" Case Winchester Compression-Formed, "Double A", "Xpert" and "Super-X" | | | | | | |
|--|-----------|--------|-----------------|--|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 3/4 oz. | Win. 209 | 452AA | 14.0 | Win. WAA20 with a 410 bore .135" card filler | 1145 | 9,700 LUP |
| 3/4 oz. | Win. 209 | 473AA | 16.0 | Rem. RXP20 with a 410 bore .135" card filler | 1145 | 8,600 LUP |
| 3/4 oz. | Win. 209 | 452AA | 15.0 | Win. WAA20 with a 410 bore .135" card filler | 1200 | 10,600 LUP |
| 3/4 oz. | Win. 209 | 473AA | 17.0 | Rem. RXP20 with a 410 bore .135" card filler | 1200 | 9,300 LUP |
| 7/8 oz.* | Win. 209 | WSF | 16.5 | Win. WAA20 | 1200 | 11,200 psi |
| 7/8 oz. | Win. 209 | WSF | 17.0 | Rem. RXP20 | 1200 | 10,700 psi |
| 7/8 oz. | Fed. 209 | WSF | 16.5 | Win. WAA20 | 1200 | 11,400 psi |
| 7/8 oz. | Fed. 209 | WSF | 17.0 | Rem. RXP20 | 1200 | 10,500 psi |
| 7/8 oz. | Fed. 209 | WSF | 16.5 | Fed. 20S1 | 1200 | 11,400 psi |
| 7/8 oz. | CCI 209 | WSF | 16.5 | Win. WAA20 | 1200 | 11,300 psi |
| 7/8 oz. | CCI 209 | WSF | 17.5 | Rem. RXP20 | 1200 | 10,500 psi |
| 7/8 oz. | CCI 209 | WSF | 16.5 | Fed. 20S1 | 1200 | 11,400 psi |
| 7/8 oz. | Fed. 209A | 540 | 19.5 | Win. WAA20 | 1200 | 10,900 psi |
| 7/8 oz. | Win. 209 | 473AA | 18.0 | Win. WAA20 | 1200 | 10,900 LUP |
| 7/8 oz. | CCI 109 | 473AA | 17.5 | Win. WAA20 | 1200 | 10,900 LUP |
| 7/8 oz. | Fed. 399 | 473AA | 18.0 | Win. WAA20 | 1200 | 11,100 LUP |
| 1 oz.** | Win. 209 | 540 | 21.5 | Win. WAA20F1 | 1165 | 9,900 LUP |
| 1 oz. | Win. 209 | 540 | 23.0 | Rem. SP20 | 1165 | 10,000 LUP |
| 1 oz. | Win. 209 | 571 | 23.5 | Win. WAA20F1 | 1165 | 9,300 LUP |
| 1 oz. | Win. 209 | 571 | 23.5 | Rem. SP20 | 1165 | 9,800 LUP |
| 1 oz.*** | Win. 209 | 540 | 22.5 | Win. WAA20F1 | 1220 | 10,900 LUP |
| 1 oz. | Win. 209 | 540 | 24.0 | Rem. SP20 | 1220 | 10,700 LUP |
| 1 oz. | Win. 209 | 571 | 24.5 | Rem. SP20 | 1220 | 10,300 LUP |
| 1 1/8 oz. | Win. 209 | 571 | 24.5 | Rem. RP20 | 1175 | 10,200 LUP |
| 1 1/8 oz. | Fed. 209 | 571 | 24.0 | Rem. RP20 | 1175 | 11,000 LUP |
| 1 1/8 oz. | CCI 109 | 571 | 24.5 | Rem. RP20 | 1175 | 10,500 LUP |

* This load will duplicate the ballistics level of the factory Winchester 2 1/2 dram eq. AA Target Load

** This load will duplicate the ballistics level of the factory Winchester 2 1/2 dram eq. AA Target Load

*** This load will duplicate the ballistics level of the factory Winchester 2 3/4 dram eq. Super-X Load

CAUTION: DO NOT INTERCHANGE FED 209 AND FED 209A PRIMERS

| 20 Gauge 2 3/4" Case— Remington-Peters "RXP" Plastic | | | | | | |
|--|----------|--------|-----------------|--------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 7/8 oz. | Win. 209 | WSF | 17.0 | Win. WAA20 | 1200 | 10,500 psi |
| 7/8 oz. | Win. 209 | WSF | 17.5 | Rem. RXP20 | 1200 | 10,600 psi |
| 7/8 oz. | Win. 209 | WSF | 17.0 | Fed. 20S1 | 1200 | 11,300 psi |
| 7/8 oz. | Fed. 209 | WSF | 17.0 | Win. WAA20 | 1200 | 10,700 psi |
| 7/8 oz. | Fed. 209 | WSF | 17.5 | Rem. RXP20 | 1200 | 10,300 psi |
| 7/8 oz. | Fed. 209 | WSF | 17.0 | Fed. 20S1 | 1200 | 10,800 psi |
| 7/8 oz. | CCI 209 | WSF | 17.0 | Win. WAA20 | 1200 | 10,500 psi |
| 7/8 oz. | CCI 209 | WSF | 17.5 | Rem. RXP20 | 1200 | 9,700 psi |
| 7/8 oz. | CCI 209 | WSF | 17.5 | Fed. 20S1 | 1200 | 11,100 psi |
| 7/8 oz. | Win. 209 | 473AA | 17.5 | Rem. RXP20 | 1200 | 10,800 LUP |
| 7/8 oz. | Win. 209 | 540 | 20.5 | Win. WAA20 | 1200 | 9,700 LUP |
| 1 oz. | Win. 209 | 540 | 21.0 | Win. WAA20F1 | 1165 | 10,100 LUP |
| 1 oz. | Win. 209 | 571 | 23.0 | Win. WAA20F1 | 1165 | 9,700 LUP |
| 1 oz. | Win. 209 | 540 | 22.0 | Win. WAA20F1 | 1220 | 10,700 LUP |
| 1 oz. | Win. 209 | 571 | 25.0 | Win. WAA20F1 | 1240 | 10,900 LUP |
| 1 1/8 oz. | Win. 209 | 571 | 23.5 | Win. WAA20F1 | 1150 | 11,100 LUP |

| 20 Gauge 3" Case - Winchester Compression-Formed, "Super-X" | | | | | | |
|---|----------|--------|-----------------|------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1 1/8 oz. | Win. 209 | 571 | 27.0 | Win. WAA20 | 1220 | 11,000 LUP |
| 1 1/8 oz. | CCI 109 | 571 | 27.0 | Win. WAA20 | 1220 | 11,100 LUP |
| 1 3/16 oz. | Win. 209 | 571 | 27.5 | Rem. R20 | 1195 | 10,600 LUP |
| 1 1/4 oz. | Win. 209 | 571 | 24.0 | Win. WAA20 | 1135 | 10,800 LUP |
| 1 1/4 oz. | CCI 109 | 571 | 24.0 | Win. WAA20 | 1135 | 11,000 LUP |

| 28 Gauge 2 3/4" Case Winchester Compression-Formed, "Double A" and "Super-X" | | | | | | |
|--|-----------|--------|-----------------|------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 3/4 oz. | Win. 209 | 540 | 17.5 | Win. WAA28 | 1200 | 9,900 LUP |
| 3/4 oz. | CCI 109 | 540 | 17.5 | Win. WAA28 | 1200 | 10,200 LUP |
| 3/4 oz. | Fed. 209 | 540 | 17.5 | Win. WAA28 | 1200 | 10,200 LUP |
| 3/4 oz. | Fed. 209A | 540 | 15.5 | Win. WAA28 | 1200 | 11,300 psi |
| 3/4 oz. | Win. 209 | 571 | 19.0 | Win. WAA28 | 1200 | 10,200 LUP |
| 3/4 oz. | CCI 109 | 571 | 19.0 | Win. WAA28 | 1200 | 10,300 LUP |
| 3/4 oz. | Win. 209 | 571 | 20.5 | Win. WAA28 | 1260 | 11,000 LUP |
| 3/4 oz. | CCI 109 | 571 | 20.5 | Win. WAA28 | 1260 | 11,100 LUP |

| 410 Bore 2 1/2" Case Winchester Compression-Formed, "Double A" and "Super-X" | | | | | | |
|--|----------|--------|-----------------|------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1/2 oz. | Win. 209 | 296 | 13.5 | Win. WAA41 | 1150 | 9,100 LUP |
| 1/2 oz. | CCI 109 | 296 | 13.5 | Win. WAA41 | 1150 | 8,500 LUP |
| 1/2 oz. | Win. 209 | 296 | 14.0 | Win. WAA41 | 1200 | 9,800 LUP |
| 1/2 oz. | Win. 209 | 296 | 14.0 | Fed. 410SC | 1200 | 10,300 LUP |
| 1/2 oz. | CCI 109 | 296 | 14.0 | Win. WAA41 | 1200 | 9,100 LUP |
| 1/2 oz. | CCI 109 | 296 | 14.0 | Fed. 410SC | 1200 | 9,900 LUP |

| 410 Bore 2 1/2" Case Remington-Peters "SP" Plastic (New style for 209 size primer) | | | | | | |
|--|----------|--------|-----------------|------------|----------------|-----------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 1/2 oz. | Win. 209 | 296 | 15.0 | Rem. SP410 | 1200 | 9,500 LUP |

| 410 Bore 3" Case Winchester Compression-Formed, "Super-X" | | | | | | |
|---|----------|--------|-----------------|------------|----------------|------------|
| Shot Wgt. | Primer | Powder | Charge (grains) | Wad Column | Velocity (fps) | Pressure |
| 11/16 oz.* | Win. 209 | 296 | 13.5 | Win. WAA41 | 1135 | 10,800 LUP |
| 11/16 oz. | Win. 209 | 296 | 13.5 | Fed. 410SC | 1135 | 10,800 LUP |
| 11/16 oz. | Fed. 410 | 296 | 14.0 | Win. WAA41 | 1135 | 10,000 LUP |
| 11/16 oz. | Fed. 410 | 296 | 14.0 | Fed. 410SC | 1135 | 10,600 LUP |

*This load will duplicate the ballistics level of the factory Winchester Super-X Load

CAUTION: DO NOT INTERCHANGE FED 209 AND FED 209A PRIMERS

POWDER BUSHINGS AND SCALES

Caution- Read instruction manual for the reloading machine/tools.

Shotshell reloading tool powder bushings do not throw the exact charge specification in many cases. Some reasons include:

1. Variations in gravimetric density of powders from lot to lot. The tolerance is plus or minus .025 grams per cubic centimeter. This tolerance applies to most canister powders.
2. Usually a bushing chart lists the nominal weight of a powder charge based on normal packing as a result of free flow and gravimetric density of a powder or on a bushing volume and the nominal gravimetric powder density at 100% packing.
3. Various operators of a tool will get various powder weights from an identical tool and bushing. This is due to the change in force of operation and the amount of vibration transmitted to the tool with resultant amount of packing of powder.
4. The amount of sizing force required on cases being loaded can cause a change in powder drop due to the change in tool vibration.
5. Bushing manufacturing tolerances.
6. Tool manufacturing tolerances.
7. Mismarked bushings.

A bushing listing chart cannot be interpreted as an absolute. It simply represents what the manufacturer believes to be the nominal charge thrown with the listed bushing and powder.

A reloading scale is an absolute must. Charges thrown must be carefully checked and changes in bushing sizes made where required.

Do not try to determine the powder charge thrown by simply metering the powder bar back and forth and weighing charges. The tool must be cycled through the complete loading cycle to insure the same amount of vibration and powder packing as will take place in a normal loading cycle. Powder charges measured under these two conditions could vary as much as several grains.

Ponsness Warren Bushing Chart

| Bushing # | WSL | WST | WSF | 296 | 571 | 452AA | 473AA | 540 |
|-----------|------|------|------|------|------|-------|-------|------|
| 1A | 10.2 | | | 13.6 | | | | |
| 2A | 11.2 | | | 15.0 | | | | |
| 3A | 11.8 | | | 16.0 | | | | |
| A | 13.5 | | 14.0 | 18.2 | 17.2 | | | 16.7 |
| B | 14.3 | | 15.1 | 19.3 | 18.1 | | | 17.7 |
| C | 14.9 | | 15.7 | 20.0 | 18.8 | | | 18.4 |
| C1 | 15.7 | | 16.7 | | 19.9 | | | 19.4 |
| D | 16.3 | | 17.0 | | 20.4 | | | 19.9 |
| D1 | 16.6 | | 17.8 | | 21.3 | | 15.4 | 20.7 |
| E | 18.7 | | 20.0 | | 24.1 | | 17.3 | 23.5 |
| E1 | 19.6 | | 21.1 | | 25.0 | | 18.0 | 24.4 |
| E2 | 20.4 | 15.0 | 22.1 | | 26.5 | 15.3 | 19.1 | 25.8 |
| F | 22.0 | 15.9 | 23.2 | | 28.0 | 16.7 | 20.1 | 27.3 |
| F1 | 22.1 | 16.0 | 23.5 | | 28.1 | 16.8 | 20.2 | 27.4 |
| F2 | 22.7 | 16.5 | 24.6 | | 29.4 | 17.7 | 21.4 | 28.6 |
| G | 24.5 | 17.7 | 26.0 | | 31.2 | 19.0 | 22.3 | 30.4 |
| G1 | 24.7 | 17.9 | 26.3 | | 31.6 | 19.1 | 22.6 | 30.7 |
| H | 26.2 | 19.1 | 28.0 | | 33.6 | 20.2 | 24.1 | 32.8 |
| I | 27.2 | 19.8 | 29.0 | | 35.0 | 21.3 | 25.1 | 34.1 |
| J | 28.2 | 20.5 | 30.0 | | 36.2 | 21.6 | 26.1 | 35.2 |
| J1 | 29.0 | 21.3 | 31.0 | | 37.3 | 22.4 | 26.8 | 36.4 |
| K | 29.4 | 21.6 | 31.4 | | 37.7 | 23.0 | 27.2 | 36.8 |
| L | 30.6 | 22.5 | 32.7 | | 39.4 | 23.6 | 28.3 | 38.4 |
| M | 32.6 | 23.8 | 35.0 | | 41.8 | 25.2 | 30.1 | 40.7 |
| N | 34.8 | 25.5 | 36.8 | | 44.5 | 26.7 | | 43.4 |
| O | 35.0 | | 37.4 | | 44.8 | | | 43.7 |
| P | 36.5 | | | | 46.7 | | | 45.6 |
| Q | 37.7 | | | | 46.8 | | | |
| R | 38.1 | | | | 48.7 | | | |
| S | 38.6 | | | | | | | |
| T | 41.3 | | | | | | | |
| U | 44.0 | | | | | | | |
| V | 45.0 | | | | | | | |

NOTE- IMPORTANT CAUTION: These tables are not loading recommendations. Read "Powder Bushings and Scales" before using these tables. This information has been supplied by the tool manufacturers and is not a result of Winchester testing.

MEC Bushing Chart

| Bushing # | WSL | WST | WSF | 296 | 571 | 452AA | 473AA | 540 |
|-----------|------|------|------|------|------|-------|-------|------|
| 10 | 10.6 | 7.9 | 10.9 | 13.7 | 13.4 | 7.5 | 9.1 | 13.0 |
| 11 | 11.2 | 8.3 | 11.5 | 14.6 | 14.2 | 7.9 | 9.7 | 13.8 |
| 12 | 11.9 | 8.8 | 12.2 | 15.4 | 15.0 | 8.4 | 10.2 | 14.6 |
| 12A | 12.5 | 9.3 | 12.9 | 16.3 | 15.8 | 8.9 | 10.8 | 15.4 |
| 13 | 13.2 | 9.8 | 13.6 | 17.2 | 16.7 | 9.4 | 11.4 | 16.3 |
| 13A | 13.9 | 10.4 | 14.3 | 18.1 | 17.6 | 9.9 | 12.0 | 17.1 |
| 14 | 14.6 | 10.9 | 15.0 | 19.0 | 18.5 | 10.4 | 12.6 | 18.0 |
| 15 | 15.4 | 11.4 | 15.8 | 20.0 | 19.5 | 10.9 | 13.2 | 19.0 |
| 16 | 16.2 | 12.0 | 16.6 | 21.0 | 20.4 | 11.4 | 13.9 | 19.9 |
| 17 | 16.9 | 12.6 | 17.4 | 22.0 | 21.4 | 12.0 | 14.6 | 20.8 |
| 18 | 17.7 | 13.2 | 18.2 | 23.0 | 22.4 | 12.6 | 15.3 | 21.8 |
| 19 | 18.5 | 13.8 | 19.0 | 24.1 | 23.4 | 13.1 | 16.0 | 22.8 |
| 20 | 19.4 | 14.4 | 19.9 | 25.1 | 24.5 | 13.7 | 16.7 | 23.9 |
| 21 | 20.2 | 15.0 | 20.8 | 26.2 | 25.6 | 14.3 | 17.4 | 24.9 |
| 22 | 21.1 | 15.7 | 21.6 | 27.4 | 26.7 | 14.9 | 18.2 | 26.0 |
| 23 | 22.0 | 16.3 | 22.6 | 28.5 | 27.8 | 15.6 | 18.9 | 27.1 |
| 24 | 22.9 | 17.0 | 23.5 | 29.7 | 28.9 | 16.2 | 19.7 | 28.2 |
| 25 | 23.8 | 17.7 | 24.4 | 30.9 | 30.1 | 16.9 | 20.5 | 29.3 |
| 26 | 24.8 | 18.4 | 25.4 | 32.1 | 31.3 | 17.5 | 21.3 | 30.5 |
| 27 | 25.7 | 19.1 | 26.4 | 33.4 | 32.5 | 18.2 | 22.1 | 31.7 |
| 28 | 26.7 | 19.8 | 27.4 | 34.6 | 33.8 | 18.9 | 23.0 | 32.9 |
| 29 | 27.7 | 20.6 | 28.4 | 35.9 | 35.0 | 19.6 | 23.8 | 34.1 |
| 30 | 28.7 | 21.3 | 29.5 | 37.3 | 36.3 | 20.3 | 24.7 | 35.4 |
| 31 | 29.7 | 22.1 | 30.5 | 38.6 | 37.6 | 21.1 | 25.6 | 36.6 |
| 32 | 30.8 | 22.9 | 31.6 | 40.0 | 38.9 | 21.8 | 26.5 | 37.9 |
| 33 | 31.9 | 23.7 | 32.7 | 41.4 | 40.3 | 22.6 | 27.4 | 39.2 |
| 34 | 33.0 | 24.5 | 33.8 | 42.8 | 41.7 | 23.3 | 28.4 | 40.6 |
| 35 | 34.1 | 25.3 | 35.0 | 44.2 | 43.1 | 24.1 | 29.3 | 42.0 |
| 36 | 35.2 | 26.2 | 36.1 | 45.7 | 44.5 | 24.9 | 30.3 | 43.3 |
| 37 | 36.3 | 27.0 | 37.3 | 47.1 | 45.9 | 25.7 | 31.3 | 44.7 |
| 38 | 37.5 | 27.9 | 38.5 | 48.7 | 47.4 | 26.6 | 32.3 | 46.2 |
| 38A | 38.7 | 28.8 | 39.7 | 50.2 | 48.9 | 27.4 | 33.3 | 47.6 |
| 39 | 39.9 | 29.7 | 40.9 | 51.7 | 50.4 | 28.3 | 34.3 | 49.1 |
| 39A | 41.1 | 30.6 | 42.2 | 53.3 | 52.0 | 29.1 | 35.4 | 50.6 |
| 40 | 42.3 | 31.5 | 43.4 | 54.9 | 53.5 | 30.0 | 36.4 | 52.1 |
| 40A | 43.6 | 32.4 | 44.7 | 56.6 | 55.1 | 30.9 | 37.5 | 53.7 |
| 41 | 44.9 | 33.4 | 46.0 | 58.2 | 56.7 | 31.8 | 38.6 | 55.2 |
| 41A | 46.2 | 34.3 | 47.4 | 59.9 | 58.4 | 32.7 | 39.7 | 56.8 |
| 42 | 47.5 | 35.3 | 48.7 | 61.6 | 60.0 | 33.6 | 40.9 | 58.4 |
| 42A | 48.8 | 36.3 | 50.1 | 63.3 | 61.7 | 34.6 | 42.0 | 60.1 |
| 43 | 50.1 | 37.3 | 51.5 | 65.0 | 63.4 | 35.5 | 43.2 | 61.7 |
| 43A | 51.5 | 38.3 | 52.9 | 66.8 | 65.1 | 36.5 | 44.3 | 63.4 |
| 44 | 52.9 | 39.3 | 54.3 | 68.6 | 66.9 | 37.5 | 45.5 | 65.1 |
| 44A | 54.3 | 40.4 | 55.7 | 70.4 | 68.6 | 38.5 | 46.7 | 66.8 |
| 45 | 55.7 | 41.4 | 57.2 | 72.3 | 70.4 | 39.5 | 47.9 | 68.6 |
| 45A | 57.1 | 42.5 | 58.0 | 74.1 | 72.3 | 40.5 | 49.2 | 70.4 |
| 46 | 58.6 | 43.6 | 60.1 | 76.0 | 74.1 | 41.5 | 50.4 | 72.2 |

NOTE- IMPORTANT CAUTION: These tables are not loading recommendations. Read "Powder Bushings and Scales" before using these tables. This information has been supplied by the tool manufacturers and is not a result of Winchester testing.

| *Texan Bushing Chart Model "M" Only | | | | | |
|--|-------|-------|------|------|------|
| Bushing Number | 452AA | 473AA | 540 | 571 | 296 |
| 101 | | | | | 13.1 |
| 102 | | | | | 13.6 |
| 103 | | | | | 14.1 |
| 104 | | | | | 14.7 |
| 105 | | | | | 15.3 |
| 106 | | | | | 16.1 |
| 107 | | | | | |
| 108 | | | | | |
| 109 | | | 17.4 | | |
| 110 | | | 18.3 | 18.9 | |
| 111 | | | 19.2 | 19.6 | |
| 112 | | | 19.9 | 20.4 | |
| 113 | | | 20.8 | 20.6 | |
| 114 | | | 21.6 | 21.3 | |
| 115 | | | 22.5 | 23.4 | |
| 116 | | 17.0 | 23.6 | 24.3 | |
| 117 | | 17.6 | 24.4 | 25.2 | |
| 118 | | 18.4 | 25.5 | 26.3 | |
| 119 | | 18.9 | 26.2 | 27.0 | |
| 120 | | 19.9 | 27.4 | 28.3 | |
| 121 | 17.1 | 20.3 | 28.1 | 29.0 | |
| 122 | 17.7 | 21.0 | 29.1 | 30.1 | |
| 123 | 18.3 | 21.7 | 30.2 | 31.2 | |
| 124 | 18.8 | 22.3 | 30.9 | 32.0 | |
| 125 | 19.5 | 22.9 | 31.7 | 33.0 | |
| 126 | 20.1 | 23.8 | 33.0 | 34.3 | |
| 127 | 20.7 | 24.5 | 34.0 | 35.3 | |
| 128 | 21.2 | 25.2 | 34.9 | 36.3 | |
| 129 | 21.8 | 25.9 | 35.9 | 37.3 | |
| 130 | 22.4 | 26.6 | 36.9 | 38.5 | |
| 131 | 23.0 | 27.5 | 38.1 | 39.6 | |
| 132 | 23.6 | 28.2 | 39.0 | 40.7 | |
| 133 | 24.3 | 29.0 | 40.1 | 41.8 | |
| 134 | 24.9 | | | 42.9 | |
| 135 | 25.3 | | | 43.8 | |
| 136 | | | | 45.2 | |

| *Texan Bushing Chart Models GT, FW, LT, A, AP, D and DP | | | | | |
|--|-------|-------|------|------|------|
| Bushing Number | 452AA | 473AA | 540 | 571 | 296 |
| 101 | | | | | 13.5 |
| 102 | | | | | 14.1 |
| 103 | | | | | 14.6 |
| 104 | | | | | 15.3 |
| 105 | | | | | 16.0 |
| 106 | | | | | |
| 107 | | | | | |
| 108 | | | 16.9 | | |
| 109 | | | 17.7 | | |
| 110 | | | 18.3 | 18.6 | |
| 111 | | | 19.4 | 19.7 | |
| 112 | | | 20.2 | 20.6 | |
| 113 | | | 21.0 | 21.4 | |
| 114 | | | 21.9 | 22.3 | |
| 115 | | | 22.7 | 23.2 | |
| 116 | | 17.2 | 23.6 | 24.2 | |
| 117 | | 18.0 | 24.8 | 25.3 | |
| 118 | | 18.6 | 25.6 | 26.2 | |
| 119 | | 19.4 | 26.7 | 27.4 | |
| 120 | 16.9 | 19.9 | 27.5 | 28.1 | |
| 121 | 17.7 | 20.8 | 28.8 | 29.5 | |
| 122 | 18.0 | 21.4 | 29.4 | 30.2 | |
| 123 | 18.7 | 22.2 | 30.5 | 31.4 | |
| 124 | 19.3 | 22.9 | 31.6 | 32.4 | |
| 125 | 19.8 | 23.5 | 32.4 | 33.3 | |
| 126 | 20.3 | 24.2 | 33.5 | 34.5 | |
| 127 | 21.0 | 25.1 | 34.6 | 35.6 | |
| 128 | 21.6 | 25.9 | 35.6 | 36.6 | |
| 129 | 22.2 | 26.6 | 36.6 | 37.6 | |
| 130 | 22.8 | 27.3 | 37.5 | 38.6 | |
| 131 | 23.5 | 28.1 | 38.6 | 39.9 | |
| 132 | 24.1 | 29.0 | 39.9 | 41.1 | |
| 133 | 24.7 | | 40.9 | 42.1 | |
| 134 | 25.3 | | | 43.2 | |
| 135 | | | | 44.2 | |
| 136 | | | | 44.4 | |

*Texan bushings are no longer manufactured. See alternate charts for new powder series.

| Lee Precision-Load-All/Fast | | | | | | | | | | | | | |
|-----------------------------|--------|------|------|------|------|-------|-------|------|------|------|------|------|------|
| Bushing (Cu. In.) | Grains | | | | | | | | | | | | |
| | WSF | WSL | WST | 231 | 296 | 452AA | 473AA | 540 | 571 | 630 | 748 | 760 | 785 |
| .095 | 18.5 | 18.4 | 12.9 | 16.7 | 23.7 | 13.3 | 16.0 | 22.8 | 22.9 | 23.4 | 23.8 | 23.4 | 23.8 |
| .100 | 19.5 | 19.3 | 13.6 | 17.6 | 25.0 | 14.0 | 16.8 | 24.0 | 24.1 | 24.6 | 25.0 | 24.6 | 25.0 |
| .105 | 20.5 | 20.3 | 14.3 | 18.5 | 26.2 | 14.7 | 17.6 | 25.2 | 25.3 | 25.8 | 26.3 | 25.8 | 26.3 |
| .110 | 21.5 | 21.3 | 15.0 | 19.4 | 27.5 | 15.4 | 18.5 | 26.4 | 26.5 | 27.1 | 27.5 | 27.1 | 27.5 |
| .116 | 22.6 | 22.4 | 15.8 | 20.4 | 29.0 | 16.2 | 19.5 | 27.8 | 28.0 | 28.5 | 29.0 | 28.5 | 29.0 |
| .122 | 23.8 | 23.6 | 16.6 | 21.5 | 30.5 | 17.1 | 20.5 | 29.3 | 29.4 | 30.0 | 30.5 | 30.0 | 30.5 |
| .128 | 25.0 | 24.8 | 17.4 | 22.5 | 32.0 | 17.9 | 21.5 | 30.7 | 30.8 | 31.5 | 32.0 | 31.5 | 32.0 |
| .134 | 26.1 | 25.9 | 18.2 | 23.6 | 33.5 | 18.8 | 22.5 | 32.2 | 32.3 | 33.0 | 33.5 | 33.0 | 33.5 |
| .141 | 27.5 | 27.3 | 19.2 | 24.8 | 35.2 | 19.7 | 23.7 | 33.8 | 34.0 | 34.7 | 35.3 | 34.7 | 35.3 |
| .148 | 28.9 | 28.6 | 20.1 | 26.0 | 37.0 | 20.7 | 24.9 | 35.5 | 35.7 | 36.4 | 37.0 | 36.4 | 37.0 |
| .151 | 29.4 | 29.2 | 20.5 | 26.6 | 37.7 | 21.1 | 25.4 | 36.2 | 36.4 | 37.1 | 37.8 | 37.1 | 37.8 |
| .155 | 30.2 | 30.0 | 21.1 | 27.3 | 38.7 | 21.7 | 26.0 | 37.2 | 37.4 | 38.1 | 38.8 | 38.1 | 38.8 |
| .163 | 31.8 | 31.5 | 22.2 | 28.7 | 40.7 | 22.8 | 27.4 | 39.1 | 39.3 | 40.1 | 40.8 | 40.1 | 40.8 |
| .171 | 33.3 | 33.1 | 23.3 | 30.1 | 42.7 | 23.9 | 28.7 | 41.0 | 41.2 | 42.1 | 42.8 | 42.1 | 42.8 |
| .180 | 35.1 | 34.8 | 24.5 | 31.7 | 45.0 | 25.2 | 30.2 | 43.2 | 43.4 | 44.3 | 45.0 | 44.3 | 45.0 |
| .189 | 36.9 | 36.5 | 25.7 | 33.3 | 47.2 | 26.5 | 31.8 | 45.4 | 45.6 | 46.5 | 47.3 | 46.5 | 47.3 |
| .198 | 38.6 | 38.3 | 26.9 | 34.8 | 49.5 | 27.7 | 33.3 | 47.5 | 47.7 | 48.7 | 49.5 | 48.7 | 49.5 |

NOTE- IMPORTANT CAUTION: These tables are not loading recommendations. Read "Powder Bushings and Scales" before using these tables. This information has been supplied by the tool manufacturers and is not a result of Winchester testing.

| Lee Precision- Auto Disk | | | | | | | | | | | | | |
|--------------------------|--------|------|------|------|------|-------|-------|------|------|------|------|------|------|
| Disk (cc) | Grains | | | | | | | | | | | | |
| | WSF | WSL | WST | 231 | 296 | 452AA | 473AA | 540 | 571 | 630 | 748 | 760 | 785 |
| 0.30 | 3.6 | 3.5 | 2.5 | 3.2 | 4.6 | 2.6 | 3.1 | 4.4 | 4.4 | 4.5 | 4.6 | 4.5 | 4.6 |
| 0.32 | 3.8 | 3.8 | 2.7 | 3.4 | 4.9 | 2.7 | 3.3 | 4.7 | 4.7 | 4.8 | 4.9 | 4.8 | 4.9 |
| 0.34 | 4.0 | 4.0 | 2.8 | 3.7 | 5.2 | 2.9 | 3.5 | 5.0 | 5.0 | 5.1 | 5.2 | 5.1 | 5.2 |
| 0.37 | 4.4 | 4.4 | 3.1 | 4.0 | 5.6 | 3.2 | 3.8 | 5.4 | 5.4 | 5.6 | 5.6 | 5.6 | 5.6 |
| 0.40 | 4.8 | 4.7 | 3.3 | 4.3 | 6.1 | 3.4 | 4.1 | 5.9 | 5.9 | 6.0 | 6.1 | 6.0 | 6.1 |
| 0.43 | 5.1 | 5.1 | 3.6 | 4.6 | 6.6 | 3.7 | 4.4 | 6.3 | 6.3 | 6.5 | 6.6 | 6.5 | 6.6 |
| 0.46 | 5.5 | 5.4 | 3.8 | 4.9 | 7.0 | 3.9 | 4.7 | 6.7 | 6.8 | 6.9 | 7.0 | 6.9 | 7.0 |
| 0.49 | 5.8 | 5.8 | 4.1 | 5.3 | 7.5 | 4.2 | 5.0 | 7.2 | 7.2 | 7.4 | 7.5 | 7.4 | 7.5 |
| 0.53 | 6.3 | 6.3 | 4.4 | 5.7 | 8.1 | 4.5 | 5.4 | 7.8 | 7.8 | 8.0 | 8.1 | 8.0 | 8.1 |
| 0.57 | 6.8 | 6.7 | 4.7 | 6.1 | 8.7 | 4.9 | 5.8 | 8.3 | 8.4 | 8.6 | 8.7 | 8.6 | 8.7 |
| 0.61 | 7.3 | 7.2 | 5.1 | 6.6 | 9.3 | 5.2 | 6.3 | 8.9 | 9.0 | 9.2 | 9.3 | 9.2 | 9.3 |
| 0.66 | 7.9 | 7.8 | 5.5 | 7.1 | 10.1 | 5.6 | 6.8 | 9.7 | 9.7 | 9.9 | 10.1 | 9.9 | 10.1 |
| 0.71 | 8.4 | 8.4 | 5.9 | 7.6 | 10.8 | 6.1 | 7.3 | 10.4 | 10.4 | 10.7 | 10.8 | 10.7 | 10.8 |
| 0.76 | 9.0 | 9.0 | 6.3 | 8.2 | 11.6 | 6.5 | 7.8 | 11.1 | 11.2 | 11.4 | 11.6 | 11.4 | 11.6 |
| 0.82 | 9.8 | 9.7 | 6.8 | 8.8 | 12.5 | 7.0 | 8.4 | 12.0 | 12.1 | 12.3 | 12.5 | 12.3 | 12.5 |
| 0.88 | 10.5 | 10.4 | 7.3 | 9.5 | 13.4 | 7.5 | 9.0 | 12.9 | 12.9 | 13.2 | 13.4 | 13.2 | 13.4 |
| 0.95 | 11.3 | 11.2 | 7.9 | 10.2 | 14.5 | 8.1 | 9.7 | 13.9 | 14.0 | 14.3 | 14.5 | 14.3 | 14.5 |
| 1.02 | 12.1 | 12.0 | 8.5 | 11.0 | 15.6 | 8.7 | 10.5 | 14.9 | 15.0 | 15.3 | 15.6 | 15.3 | 15.6 |
| 1.09 | 13.0 | 12.9 | 9.0 | 11.7 | 16.6 | 9.3 | 11.2 | 16.0 | 16.0 | 16.4 | 16.6 | 16.4 | 16.6 |
| 1.18 | 14.0 | 13.9 | 9.8 | 12.7 | 18.0 | 10.1 | 12.1 | 17.3 | 17.4 | 17.7 | 18.0 | 17.7 | 18.0 |
| 1.26 | 15.0 | 14.9 | 10.5 | 13.5 | 19.2 | 10.8 | 12.9 | 18.5 | 18.5 | 18.9 | 19.2 | 18.9 | 19.2 |
| 1.36 | 16.2 | 16.0 | 11.3 | 14.6 | 20.7 | 11.6 | 13.9 | 19.9 | 20.0 | 20.4 | 20.7 | 20.4 | 20.7 |
| 1.46 | 17.4 | 17.2 | 12.1 | 15.7 | 22.3 | 12.5 | 15.0 | 21.4 | 21.5 | 21.9 | 22.3 | 21.9 | 22.3 |
| 1.57 | 18.7 | 18.5 | 13.0 | 16.9 | 24.0 | 13.4 | 16.1 | 23.0 | 23.1 | 23.6 | 24.0 | 23.6 | 24.0 |

| Lee Precision- Dippers | | | | | | | | | | | |
|------------------------|--------|------|------|------|------|-------|-------|------|------|------|------|
| Dippers (cc) | Grains | | | | | | | | | | |
| | WSF | WSL | WST | 231 | 296 | 452AA | 473AA | 540 | 571 | 630 | 785 |
| 0.30 | 3.6 | 3.5 | 2.5 | 3.2 | 4.6 | 2.6 | 3.1 | 4.4 | 4.4 | 4.5 | 4.6 |
| 0.50 | 6.0 | 5.9 | 4.2 | 5.4 | 7.6 | 4.3 | 5.1 | 7.3 | 7.4 | 7.5 | 7.6 |
| 0.70 | 8.3 | 8.3 | 5.8 | 7.5 | 10.7 | 6.0 | 7.2 | 10.3 | 10.3 | 10.5 | 10.7 |
| 1.00 | 11.9 | 11.8 | 8.3 | 10.7 | 15.3 | 8.5 | 10.3 | 14.6 | 14.7 | 15.0 | 15.3 |
| 1.30 | 15.5 | 15.3 | 10.8 | 14.0 | 19.8 | 11.1 | 13.3 | 19.0 | 19.1 | 19.5 | 19.8 |
| 1.60 | 19.0 | 18.9 | 13.3 | 17.2 | 24.4 | 13.7 | 16.4 | 23.4 | 23.5 | 24.0 | 24.4 |
| 1.90 | 22.6 | 22.4 | 15.8 | 20.4 | 29.0 | 16.2 | 19.5 | 27.8 | 27.9 | 28.5 | 29.0 |
| 2.20 | 26.2 | 26.0 | 18.3 | 23.6 | 33.6 | 18.8 | 22.6 | 32.2 | 32.4 | 33.0 | 33.6 |
| 2.50 | 29.8 | 29.5 | 20.8 | 26.8 | 38.1 | 21.4 | 25.6 | 36.6 | 36.8 | 37.5 | 38.1 |
| 2.80 | 33.3 | 33.0 | 23.2 | 30.1 | 42.7 | 23.9 | 28.7 | 41.0 | 41.2 | 42.0 | 42.7 |
| 3.10 | 36.9 | 36.6 | 25.7 | 33.3 | 47.3 | 26.5 | 31.8 | 45.4 | 45.6 | 46.5 | 47.3 |
| 3.40 | 40.5 | 40.1 | 28.2 | 36.5 | 51.9 | 29.0 | 34.9 | 49.8 | 50.0 | 51.0 | 51.9 |
| 3.70 | 44.0 | 43.7 | 30.7 | 39.7 | 56.4 | 31.6 | 37.9 | 54.2 | 54.4 | 55.5 | 56.4 |
| 4.00 | 47.6 | 47.2 | 33.2 | 43.0 | 61.0 | 34.2 | 41.0 | 58.6 | 58.8 | 60.0 | 61.0 |
| 4.30 | 51.2 | 50.7 | 35.7 | 46.2 | 65.6 | 36.7 | 44.1 | 63.0 | 63.2 | 64.6 | 65.6 |

NOTE- IMPORTANT CAUTION: These tables are not loading recommendations. Read "Powder Bushings and Scales" before using these tables. This information has been supplied by the tool manufacturers and is not a result of Winchester testing.

METALLIC



METALLIC CARTRIDGE RELOADING

Data Generation

Data tested for the current handbook included not only the various tests for pressure and velocity at ambient 70 degrees F, but also tests with powder positioned at the primer and the bullet to simulate muzzle up, muzzle down conditions. Further, the same kind of tests are run at +140 degrees F and -40 degrees F. A criterion for all these tests was the data listed for handloading provide results which would meet the stringent criteria which Winchester applied to factory ammunition. Such stringent testing resulted in not listing some calibers and/or bullet weights with Winchester's current line of powders because Winchester was not satisfied with the results. It is possible the reloader would never have noticed the difference, but Winchester wants to supply only the very best data possible. In some cases, certain loads were not included for safety reason.

For the present, this data book represents all the applications of BALL POWDER® Propellant Winchester has been able to qualify.

Under no circumstances would Winchester presume to suggest data which exceeds the Sporting Arms and Ammunition Manufacturers Institute's suggested recommended loading limit.

Powder Burning Rates

Do not use any burning rate chart as a guide to reloading.

Burning rate charts are developed in closed bomb tests. The closed bomb test results merely serve as a very vague guide to the laboratory technician equipped with the necessary pressure testing equipment. Closed bomb charts as developed by a powder manufacturer include only powder of their manufacture. So-called "burning rate charts" are usually the result of estimates of where powders would fit if they were to develop a closed bomb test list for all brand powders.

When powders are used in cartridge cases of varying sizes and shapes, the so-called burning rates can and do vary depending upon the exact set of loading circumstances. One can easily discover this by carefully examining a manufacturer's loading data.

Such changes in apparent burning rates come as no surprise to the ballistician who regards closed bomb test results as merely a very crude guide. The same changes, however, have resulted in more than one reloader having trouble when attempting to extrapolate data from a burning rate chart.

Reloading data should never be extrapolated and since burning rate charts tend to be misleading, and are often the source of grief to the reloader, Winchester does not suggest the positioning of Winchester® powders on any burning rate chart.

Old Brass

Most of the older, obsolete cartridge cases were designed for use with Black Powder, the only available propellant at the time. The primers used contained a mercury fulminate mixture as the initiator. The mercury, by itself, is ruinous to the brass case, if it comes in direct contact with it, causing embrittlement and weakening of the brass structure. Fortunately for the old-timers using black powder, the powder fouling itself tended to dilute the effect of the mercury on the brass case.

The advent of smokeless powder greatly magnified using the mercuric effect upon the brass cases, particularly these cases which were reloaded and refired. The cleaner burning propellant and the stronger primers used allowed the mercury to be driven deeper into the brass, causing serious weakening of the case.

The use of mercury in commercial priming mixtures continued in the U.S. until the early 1930s, when lead styphnate replaced mercury in priming. An exception to this was the continued use of a mildly mercuric priming mixture by Winchester for Super-Match® 30-06 Springfield and 300 H&H Magnum cartridges. This primer was discontinued in 1960.

Since it would be unusual for a present day handloader to acquire old and/or obsolete brass cartridge cases and be able to identify the period of manufacture, it is not worth the risk of injuring a shooter or damaging his gun to attempt to load such cases. Therefore, Winchester suggests not reloading old brass cartridge cases.

Loading Instructions

CAUTION: Carefully read the information on the powder can label and follow the recommended loading instructions and precautions contained herein before using the reloading data.

These suggested loads are based on results obtained in the Winchester laboratory under carefully controlled conditions. They are offered without a fee as an aid to handloaders, to be employed at their own discretion and risk. Since Winchester has no control over the circumstances of loading, Winchester assumes no liability for the results obtained.

The handloading of centerfire metallic cartridges should be undertaken only by those who are familiar with all safety precautions and who observe conservative practices in reloading operations. The powder charges shown are maximum and must not be exceeded.

Cases

Exercise extreme care in inspection of cases. Be sure cases are kept trimmed to the required length. Excess case length is a common cause of difficulty in reloading. Cases should be discarded prior to the fifth trimming.

Primers

All primers used for testing of the data were standard Winchester primers of the applicable size. Use caution against the substitution of any component as it can alter the ballistic level of the load. The only magnum primer used in the data testing was for 357 magnum cartridges.

| *Pacific Bushing Chart for Models “DL-155, DL-105 and DL-155APF” | | | | | |
|---|-----------------|-------|-----|-----|-----|
| Grains | Bushing Numbers | | | | |
| | 452AA | 473AA | 540 | 571 | 296 |
| 13 | | | | | 250 |
| 14 | | | | | 259 |
| 15 | | | | | |
| 16 | | | | | |
| 17 | 393 | 351 | | | |
| 18 | 396 | 363 | 303 | | |
| 19 | 402 | 372 | | 312 | |
| 20 | 414 | 381 | | 318 | |
| 21 | 423 | 393 | 327 | 327 | |
| 22 | 432 | 399 | 333 | | |
| 23 | 444 | 405 | 342 | 345 | |
| 24 | 453 | 417 | 348 | 351 | |
| 25 | 462 | 426 | | 357 | |
| 26 | | 435 | 363 | 366 | |
| 27 | | 444 | 372 | 375 | |
| 28 | | 453 | 378 | 381 | |
| 29 | | | 384 | | |
| 30 | | | | 393 | |
| 31 | | | 399 | 399 | |
| 32 | | | 405 | | |
| 33 | | | 411 | 411 | |
| 34 | | | 417 | 417 | |
| 35 | | | 423 | 423 | |
| 36 | | | 429 | 429 | |
| 37 | | | 435 | 435 | |
| 38 | | | 441 | | |

| *Pacific Bushing Chart for Model “DL-266” | | | | | |
|--|-----------------|-------|-----|-----|-----|
| Grains | Bushing Numbers | | | | |
| | 452AA | 473AA | 540 | 571 | 296 |
| 13 | | | | | 256 |
| 14 | | | | | 266 |
| 15 | | | | | |
| 16 | | | | | |
| 17 | 384 | 357 | 300 | | |
| 18 | 396 | 366 | 309 | | |
| 19 | 408 | 378 | 315 | 318 | |
| 20 | 420 | 387 | 321 | 327 | |
| 21 | 432 | 396 | 333 | 333 | |
| 22 | 441 | 402 | 339 | 339 | |
| 23 | 450 | 411 | 348 | 351 | |
| 24 | 459 | 423 | 354 | 357 | |
| 25 | 474 | 432 | 360 | 363 | |
| 26 | | 438 | 369 | 369 | |
| 27 | | 450 | 375 | 378 | |
| 28 | | 456 | 384 | 387 | |
| 29 | | | 390 | 393 | |
| 30 | | | 396 | 399 | |
| 31 | | | 402 | 405 | |
| 32 | | | 408 | 411 | |
| 33 | | | 414 | 417 | |
| 34 | | | 420 | 423 | |
| 35 | | | 429 | 429 | |
| 36 | | | 435 | 435 | |
| 37 | | | 441 | 441 | |
| 38 | | | 447 | | |

NOTE- IMPORTANT CAUTION: These tables are not loading recommendations. Read “Powder Bushings and Scales” before using these tables. This information has been supplied by the tool manufacturers and is not a result of Winchester testing.

| *Pacific Bushing Chart for Model “DL-366” | | | | | |
|--|-----------------|-------|-----|-----|-----|
| Grains | Bushing Numbers | | | | |
| | 452AA | 473AA | 540 | 571 | 296 |
| 13 | | | | | 256 |
| 14 | | | | | 266 |
| 15 | | | | | |
| 16 | | | | | |
| 17 | 390 | 357 | 300 | | |
| 18 | 402 | 369 | 309 | | |
| 19 | 411 | 381 | 318 | 318 | |
| 20 | 420 | 390 | 327 | 330 | |
| 21 | 432 | 399 | 336 | 339 | |
| 22 | 441 | 408 | 345 | 348 | |
| 23 | 450 | 414 | 351 | 357 | |
| 24 | 462 | 426 | 360 | 363 | |
| 25 | 474 | 435 | 366 | 369 | |
| 26 | | 444 | 375 | 378 | |
| 27 | | 450 | 381 | 384 | |
| 28 | | 462 | 387 | 390 | |
| 29 | | | 393 | 396 | |
| 30 | | | 402 | 405 | |
| 31 | | | 408 | 411 | |
| 32 | | | 414 | 417 | |
| 33 | | | 423 | 423 | |
| 34 | | | 429 | 429 | |
| 35 | | | 435 | 438 | |
| 36 | | | 441 | 444 | |
| 37 | | | 444 | 450 | |
| 38 | | | 450 | | |

| Hornady Pistol Measure Bushing Chart | | | | | |
|---|------|-----|-----|------|------|
| Bushing Number | WSL | WST | 231 | 296 | 680 |
| 1 | 3.1 | 2.3 | 3.0 | | |
| 2 | 3.3 | 2.5 | 3.3 | | |
| 3 | 3.7 | 2.7 | 3.6 | | |
| 4 | 4.1 | 3.0 | 4.1 | | |
| 5 | 4.5 | 3.3 | 4.5 | | |
| 6 | 4.6 | 3.4 | 4.6 | | |
| 7 | 4.9 | 3.7 | 4.8 | | |
| 8 | 5.4 | 4.0 | 5.3 | | |
| 9 | 5.5 | 4.1 | 5.5 | | |
| 10 | 6.3 | 4.6 | 6.3 | | |
| 11 | 6.4 | 4.8 | 6.4 | | 8.8 |
| 12 | 6.9 | 5.1 | 6.9 | | 9.5 |
| 13 | 7.6 | 5.6 | 7.6 | 10.3 | 10.5 |
| 14 | 8.2 | 6.0 | 8.1 | 11.0 | 11.2 |
| 15 | 8.6 | 6.3 | 8.5 | 11.6 | 11.9 |
| 16 | 9.0 | 6.6 | 8.9 | 12.2 | 12.6 |
| 17 | 10.0 | 7.3 | 9.9 | 13.6 | 13.8 |
| 18 | 10.4 | 7.5 | | 14.0 | 14.3 |
| 19 | 10.6 | 7.9 | | 14.7 | 15.1 |
| 20 | 11.5 | 8.4 | | 15.6 | 16.0 |
| 21 | 12.6 | 9.2 | | 17.1 | 17.5 |
| 22 | 13.2 | 9.6 | | 17.9 | 18.3 |

*Pacific bushings are no longer manufactured. See Hornady charts for new powder series.

| Hornady 366 and 91 Bushing Chart | | | | | | | | |
|----------------------------------|-------------|-----|-----|-----|-------|-------|-----|-----|
| Grains | Bushing No. | | | | | | | |
| | WSF | WSL | WST | 296 | 452AA | 473AA | 540 | 571 |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | 256 | | | | |
| 14 | | | | 266 | 360 | 327 | | |
| 15 | | | | | 369 | 339 | | |
| 15.5 | 327 | | | | | | | |
| 16 | 330 | 333 | | | 381 | 348 | | |
| 16.5 | 336 | 339 | | | | | | |
| 17 | 342 | 345 | 405 | | 390 | 357 | 300 | |
| 17.5 | 348 | 348 | 411 | | | | | |
| 18 | 351 | 354 | 417 | | 402 | 369 | 309 | |
| 18.5 | 354 | 360 | 423 | | | | | |
| 19 | | 363 | 429 | | 411 | 381 | 318 | 318 |
| 19.5 | | 366 | 435 | | | | | |
| 20 | | 372 | 438 | | 420 | 390 | 327 | 330 |
| 20.5 | | 378 | 444 | | | | | |
| 21 | | 381 | 450 | | 432 | 399 | 336 | 339 |
| 21.5 | | 387 | 456 | | | | | |
| 22 | | 390 | 459 | | 441 | 408 | 345 | 348 |
| 22.5 | | 396 | 465 | | | | | |
| 23 | | 402 | 471 | | 450 | 414 | 351 | 357 |
| 23.5 | | 405 | 477 | | | | | |
| 24 | | | 480 | | 462 | 426 | 360 | 363 |
| 25 | 411 | | | | 474 | 435 | 366 | 369 |
| 25.5 | 414 | | | | | | | |
| 26 | 420 | | | | | 444 | 375 | 378 |
| 26.5 | 423 | | | | | | | |
| 27 | 426 | | | | | 450 | 381 | 384 |
| 27.5 | 429 | | | | | | | |
| 28 | 432 | | | | | 462 | 387 | 390 |
| 28.5 | 438 | | | | | | | |
| 29 | 441 | | | | | 474 | 393 | 396 |
| 29.5 | 447 | | | | | | | |
| 30 | 450 | | | | | | 402 | 405 |
| 30.5 | 453 | | | | | | | |
| 31 | 456 | | | | | | 408 | 411 |
| 31.5 | 459 | | | | | | | |
| 32 | 462 | | | | | | 414 | 417 |
| 33 | | | | | | | 423 | 423 |
| 34 | | | | | | | 429 | 429 |
| 35 | | | | | | | 435 | 438 |
| 36 | | | | | | | 441 | 444 |
| 37 | | | | | | | 444 | 450 |
| 38 | | | | | | | 450 | 456 |
| 39 | | | | | | | 459 | 462 |
| 40 | | | | | | | 465 | 468 |
| 41 | | | | | | | 471 | 474 |
| 42 | | | | | | | 477 | 480 |
| 43 | | | | | | | 483 | 486 |
| 44 | | | | | | | 489 | 492 |

NOTE- IMPORTANT CAUTION: These tables are not loading recommendations. Read “Powder Bushings and Scales” before using these tables. This information has been supplied by the tool manufacturers and is not a result of Winchester testing.

Powder

Check all powder charges with a good scale. All loads listed are maximum loads. **You must start 10% below the suggested load and work up to the maximum load carefully, except as follows:**

The loads for 8mm Mauser and 338 Winchester Magnum must be used exactly as shown. No reductions in powder charge or change in components should be made because such changes can cause dangerous pressures.

BLACK POWDER WARNING: Never substitute smokeless powder for black powder or Pyrodex or mix smokeless powder with black powder or Pyrodex. Never use smokeless powder in black powder firearms or in saluting cannons. Smokeless powder has much more energy than black powder or Pyrodex. Substituting or mixing powders may cause the firearm to blow up resulting in personal injury, property damage, or death.

Pressure

All new pressure data has been measured with the latest piezo electric system showing actual pounds per square inch (psi) and cannot be compared directly to the old data which used the copper crusher pressure measurement method. This data replaces all previously published load data.

CENTERFIRE RIFLE LOADING DATA

The data for metallic cartridges contained in this handbook were obtained using Winchester cases and primers. Substitution of components other than bullets of the same size and weight from reputable manufacturers could alter the ballistic level and safety of these loads. Winchester strongly urges when using this information you use the components as shown.

Interpolation of additional loads from this data should not be attempted. Such practice can be dangerous. Winchester has strived to show those applications for which BALL POWDER smokeless propellant is most ideally suited. While other loads are certainly possible, the only way such loads can be developed is in a ballistic laboratory. Winchester cautions against the use of any other loads with BALL POWDER smokeless propellant except where such loads have been adequately proven with the proper testing.

Velocity

Velocities quoted in the tables are averages of a series of shots fired in accordance with equipment and techniques universally used throughout the American arms and ammunition industry. Listed loads have given uniform velocity results in our tests.

All rifle velocities quoted have been measured in standard SAAMI* barrels of 24-inch length, except the 30 carbine data which was obtained in a 20" barrel.

*Sporting Arms and Ammunition Manufacturers Institute.

Bullet Descriptions

| Abbreviation | Description | Abbreviation | Description |
|--------------|----------------------------|--------------|----------------------|
| FMJ | Full Metal Jacket | HSP | Hollow Soft Point |
| FMJBT | Full Metal Jacket Boattail | OPE | Open Point Expanding |
| FS | Fail Safe | PSP | Pointed Soft Point |
| HP | Hollow Point | SP | Soft Point |
| HPBT | Hollow Point Boattail | ST | Silvertip |

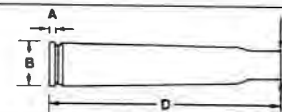
WARNING: Fail Safe™ bullets are longer than many other bullets of the same weight. To avoid excessive pressure, DO NOT load Fail Safe bullets to the same powder charge recommended for other bullets of the same weight. Handload only in strict compliance with load data for Winchester Fail Safe bullets. Incorrect use of these components or incorrectly handloaded ammunition can cause serious injury or damage. Wear eye protection when handloading.

Nominal Bullet Diameters (Jacketed)

| Caliber | Dia. | Caliber | Dia. |
|-----------------------|-------|-----------------------|-------|
| 22 Hornet | .224" | 30 Carbine | .308" |
| 222 Remington | .224" | 30 Remington | .308" |
| 223 Remington & 5.56 | .224" | 30/30 Winchester | .308" |
| 222 Remington Magnum | .224" | 300 Savage | .308" |
| 225 Winchester | .224" | 30/40 Krag | .308" |
| 22/250 Remington | .224" | 308 Winchester | .308" |
| 243 Winchester | .243" | 30/06 Springfield | .308" |
| 6mm Remington | .243" | 300 Winchester Magnum | .308" |
| 25/20 Winchester | .257" | 307 Winchester | .308" |
| 25/35 Winchester | .257" | 303 Savage | .311" |
| 250/3000 Savage | .257" | 32 Winchester Special | .321" |
| 257 Roberts +P | .257" | 8mm Mauser | .322" |
| 25/06 Remington | .257" | 338 Winchester Magnum | .338" |
| 264 Winchester Magnum | .264" | 348 Winchester | .348" |
| 270 Winchester | .277" | 35 Remington | .358" |
| 7mm Mauser | .284" | 356 Winchester | .358" |
| 284 Winchester | .284" | 358 Winchester | .358" |
| 280 Remington | .284" | 375 H&H Magnum | .375" |
| 7mm Remington | .284" | 375 Winchester | .376" |
| 7mm/08 Remington | .284" | 44/40 Winchester | .426" |
| | | 458 Winchester Magnum | .457" |

Rifle Case Dimensions

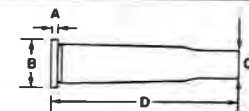
Rimless Rifle Cases



| Caliber | Maximum Dimensions | | | | Trim To Length |
|----------------------|--------------------|-------|-------|--------|----------------|
| | A | B | C* | D | |
| 222 Remington | .045" | .378" | .253" | 1.700" | 1.690" |
| 223 & 5.56 Remington | .045 | .378 | .253 | 1.760 | 1.750 |
| 222 Remington Magnum | .045 | .378 | .253 | 1.850 | 1.840 |
| 22/250 Remington | .049 | .473 | .254 | 1.912 | 1.902 |
| 243 Winchester | .054 | .473 | .276 | 2.045 | 2.035 |
| 6mm Remington | .048 | .472 | .276 | 2.233 | 2.225 |
| 250/3000 Savage | .049 | .473 | .285 | 1.912 | 1.902 |
| 257 Roberts +P | .049 | .473 | .290 | 2.233 | 2.223 |
| 25/06 Remington | .049 | .473 | .290 | 2.494 | 2.484 |
| 270 Winchester | .049 | .473 | .308 | 2.540 | 2.530 |
| 284 Winchester | .054 | .473 | .320 | 2.170 | 2.160 |
| 7mm Mauser | .049 | .473 | .320 | 2.235 | 2.225 |
| 7mm/08 Remington | .054 | .473 | .315 | 2.035 | 2.025 |
| 280 Remington | .048 | .472 | .315 | 2.540 | 2.530 |
| 30 Carbine | .050 | .360 | .336 | 1.290 | 1.286 |
| 30 Remington | .049 | .422 | .331 | 2.050 | 2.040 |
| 300 Savage | .049 | .473 | .339 | 1.871 | 1.860 |
| 308 Winchester | .054 | .473 | .343 | 2.015 | 2.005 |
| 30/06 Springfield | .049 | .473 | .339 | 2.494 | 2.484 |
| 8mm Mauser | .049 | .473 | .349 | 2.240 | 2.235 |
| 35 Remington | .050 | .460 | .383 | 1.920 | 1.910 |
| 358 Winchester | .054 | .473 | .388 | 2.015 | 2.005 |

*This dimension is with bullet seated

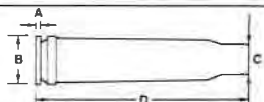
Rimmed Rifle Cases



| Caliber | Maximum Dimensions | | | | Trim To Length |
|-----------------------|--------------------|-------|-------|--------|----------------|
| | A | B | C* | D | |
| 22 Hornet | .065" | .350" | .242" | 1.403" | 1.393" |
| 225 Winchester | .049 | .473 | .260 | 1.930 | 1.920 |
| 25/20 Winchester | .065 | .408 | .273 | 1.330 | 1.320 |
| 25/35 Winchester | .063 | .506 | .282 | 2.043 | 2.033 |
| 303 Savage | .063 | .505 | .333 | 2.015 | 2.010 |
| 30/30 Winchester | .063 | .506 | .330 | 2.039 | 2.028 |
| 30/40 Krag | .064 | .545 | .338 | 2.314 | 2.304 |
| 307 Winchester | .063 | .506 | .343 | 2.010 | 2.005 |
| 32 Winchester Special | .063 | .506 | .343 | 2.040 | 2.035 |
| 348 Winchester | .070 | .610 | .376 | 2.255 | 2.245 |
| 356 Winchester | .063 | .506 | .388 | 2.010 | 2.005 |
| 375 Winchester | .063 | .506 | .400 | 2.020 | 2.015 |
| 44/40 Winchester | .065 | .525 | .443 | 1.305 | 1.300 |

*This dimension is with bullet seated

Belted Rifle Cases



Maximum Dimensions

| Caliber | A | B | C* | D | Trim To Length |
|-----------------------|-------|-------|-------|--------|----------------|
| 264 Winchester Magnum | .050" | .532" | .298" | 2.500" | 2.490" |
| 7mm Remington Magnum | .050 | .532 | .315 | 2.500 | 2.490 |
| 300 Winchester Magnum | .050 | .532 | .340 | 2.620 | 2.610 |
| 338 Winchester Magnum | .050 | .532 | .369 | 2.500 | 2.490 |
| 375 H&H Magnum | .050 | .532 | .404 | 2.850 | 2.840 |
| 458 Winchester Magnum | .050 | .532 | .480 | 2.500 | 2.495 |

*This dimension is with bullet seated.

Maximum Overall Lengths with Bullet Seated

| Caliber | Length | Caliber | Length |
|----------------------|--------|-----------------------|--------|
| 22 Hornet | 1.723" | 303 Savage | 2.520" |
| 222 Remington | 2.130 | 30/30 Winchester | 2.550 |
| 223 & 5.56 Remington | 2.220 | 300 Savage | 2.600 |
| 222 Remington Magnum | 2.280 | 30/40 Krag | 3.089 |
| 225 Winchester | 2.500 | 307 Winchester | 2.520 |
| 22/250 Remington | 2.350 | 308 Winchester | 2.800 |
| 243 Winchester | 2.710 | 30/06 Springfield | 3.340 |
| 6mm Remington | 2.825 | 300 Winchester Magnum | 3.340 |
| 25/20 Winchester | 1.592 | 32 Winchester Special | 2.565 |
| 25/35 Winchester | 2.550 | 8mm Mauser | 3.250 |
| 250/3000 Savage | 2.515 | 338 Winchester Magnum | 3.340 |
| 257 Roberts +P | 2.775 | 348 Winchester | 2.795 |
| 25/06 Remington | 3.250 | 35 Remington | 2.525 |
| 264 Winchester | 3.340 | 356 Winchester | 2.590 |
| 270 Winchester | 3.340 | 358 Winchester | 2.780 |
| 7mm Mauser | 3.065 | 375 Winchester | 2.560 |
| 284 Winchester | 2.800 | 375 H&H Magnum | 3.600 |
| 280 Remington | 3.330 | 44/40 Winchester | 1.592 |
| 7mm Remington Magnum | 3.290 | 458 Winchester Magnum | 3.340 |
| 7mm/08 Remington | 2.800 | | |
| 30 Carbine | 1.680 | | |
| 30 Remington | 2.525 | | |

Rifle Data

| Caliber Bullet Weight & Type | Powder | Charge Weight in Grains | Velocity fps | Pressure |
|---------------------------------|--------|----------------------------|-----------------|---------------|
| 22 Hornet | | | | |
| 45 grains SP | 680 | 11.8 | 2650 | 41,000 C.U.P. |
| 46 grains OPE | 680 | 11.6 | 2590 | 40,000 C.U.P. |
| 222 Remington | | | | |
| 45 grains SP | 748 | 25.5 | 3210 | 41,000 C.U.P. |
| 46 grains OPE | 748 | 25.3 | 3125 | 38,000 C.U.P. |
| 50 grains PSP | 748 | 24.0 | 2980 | 38,000 C.U.P. |
| 52 grains HPBT | 748 | 22.6 | 2815 | 34,500 C.U.P. |
| 53 grains HP | 748 | 22.9 | 2855 | 36,000 C.U.P. |
| 55 grains SP | 748 | 24.0 | 2900 | 38,000 C.U.P. |
| 55 grains FMJ | 748 | 22.6 | 2750 | 33,800 C.U.P. |
| 223 & 5.56 Remington | | | | |
| 50 grains PSP* | 748 | 26.0 | 3200 | 40,000 C.U.P. |
| 52 grains HPBT | 748 | 25.5 | 3160 | 40,500 C.U.P. |
| 53 grains HP | 748 | 26.0 | 3200 | 43,500 C.U.P. |
| 55 grains PSP | 748 | 26.3 | 3150 | 39,000 C.U.P. |
| 55 grains FMJ | 748 | 26.2 | 3170 | 41,000 C.U.P. |

*Note: Maximum overall length on this particular load is 2.120".

Rifle Data (cont'd)

| Caliber Bullet Weight & Type | Powder | Charge Weight in Grains | Velocity fps | Pressure |
|---------------------------------|--------|----------------------------|-----------------|---------------|
| 222 Remington Magnum | | | | |
| 50 grains PSP | 748 | 27.2 | 3220 | 43,000 C.U.P. |
| 52 grains HPBT | 748 | 27.2 | 3270 | 45,500 C.U.P. |
| 53 grains HP | 748 | 27.2 | 3270 | 45,500 C.U.P. |
| 55 grains PSP | 748 | 27.2 | 3215 | 42,500 C.U.P. |
| 55 grains FMJ | 748 | 27.0 | 3215 | 44,000 C.U.P. |
| 225 Winchester | | | | |
| 46 grains OPE | 760 | 37.0 | 3650 | 46,000 C.U.P. |
| 50 grains PSP | 760 | 36.0 | 3570 | 49,000 C.U.P. |
| 55 grains SP | 760 | 35.8 | 3410 | 49,000 C.U.P. |
| 55 grains FMJ | 760 | 35.2 | 3480 | 47,500 C.U.P. |
| 22/250 Remington | | | | |
| 46 grains OPE | 748 | 36.8 | 3815 | 50,000 C.U.P. |
| 46 grains OPE | 760 | 41.0 | 3850 | 49,000 C.U.P. |
| 50 grains PSP | 748 | 35.0 | 3660 | 50,000 C.U.P. |
| 50 grains PSP | 760 | 39.5 | 3700 | 49,200 C.U.P. |
| 52 grains HPBT | 760 | 38.6 | 3595 | 46,500 C.U.P. |
| 53 grains HP | 760 | 38.6 | 3565 | 46,500 C.U.P. |
| 55 grains SP | 748 | 34.8 | 3500 | 49,500 C.U.P. |
| 55 grains FMJ | 748 | 35.6 | 3665 | 50,000 C.U.P. |
| 55 grains SP | 760 | 39.0 | 3675 | 49,000 C.U.P. |
| 55 grains FMJ | 760 | 39.5 | 3700 | 47,500 C.U.P. |
| 243 Winchester | | | | |
| 75 grains HP | 760 | 43.0 | 3320 | 49,000 C.U.P. |
| 80 grains PSP | 760 | 43.5 | 3280 | 51,000 C.U.P. |
| 80 grains PSP | WMR | 47.5 | 3250 | 54,700 psi |
| 85 grains HP | 760 | 40.5 | 3150 | 49,000 C.U.P. |
| 100 grains PSP | WMR | 44.7 | 3000 | 55,500 psi |
| 105 grains SP | WMR | 43.7 | 2890 | 56,500 psi |
| 25/20 Winchester | | | | |
| 60 grains OPE | 680 | 13.0 | 2300 | 26,000 C.U.P. |
| 86 grains Lead | 680 | 11.1 | 1895 | 25,500 C.U.P. |
| 86 grains SP | 680 | 11.0 | 1800 | 23,500 C.U.P. |
| 25/35 Winchester | | | | |
| 117 grains SP | 760 | 28.5 | 2200 | 34,500 C.U.P. |
| 250/3000 Savage | | | | |
| 60 grains OPE | 748 | 40.8 | 3470 | 40,500 C.U.P. |
| 60 grains OPE | 760 | 44.0 | 3330 | 39,000 C.U.P. |
| 87 grains SP | 748 | 36.0 | 2940 | 41,000 C.U.P. |
| 87 grains SP | 760 | 39.5 | 2985 | 43,500 C.U.P. |
| 100 grains SP | 748 | 35.5 | 2820 | 43,500 C.U.P. |
| 100 grains SP | 760 | 38.8 | 2820 | 42,000 C.U.P. |
| 257 Roberts +P | | | | |
| 75 grains HP | 760 | 47.8 | 3420 | 42,500 C.U.P. |
| 90 grains OPE | WMR | 48.7 | 2990 | 45,200 psi |
| 100 grains ST | WMR | 48.7 | 2935 | 48,300 psi |
| 120 grains BT | WMR | 45.6 | 2795 | 55,000 psi |
| 25/06 Remington | | | | |
| 90 grains OPE | WMR | 58.1 | 3340 | 52,700 psi |
| 100 grains ST | WMR | 58.1 | 3280 | 55,600 psi |
| 120 grains BT | WMR | 54.3 | 3055 | 60,100 psi |
| 270 Winchester | | | | |
| 100 grains SP | WMR | 59.5 | 3120 | 45,500 psi |
| 100 grains PSP | 760 | 56.0 | 3335 | 48,000 C.U.P. |
| 130 grains SP | 760 | 52.0 | 2990 | 49,500 C.U.P. |
| 130 grains SP | WMR | 58.9 | 3000 | 53,500 psi |
| 140 grains SP | WMR | 57.6 | 2930 | 57,800 psi |
| 150 grains SP | 760 | 49.0 | 2725 | 48,500 C.U.P. |
| 150 grains SP | WMR | 57.5 | 2850 | 58,200 psi |

| Rifle Data (cont'd) | | | | |
|---------------------------------|--------|----------------------------|-----------------|---------------|
| Caliber Bullet Weight & Type | Powder | Charge Weight in Grains | Velocity fps | Pressure |
| 280 Remington | | | | |
| 145 grains SP | WMR | 60.4 | 2930 | 53,500 psi |
| 160 grains ST | WMR | 57.8 | 2795 | 56,800 psi |
| 284 Winchester | | | | |
| 125 grains SP | 748 | 50.8 | 3075 | 50,000 C.U.P. |
| 125 grains SP | 760 | 57.0 | 3180 | 50,000 C.U.P. |
| 150 grains SP | 748 | 48.5 | 2770 | 49,000 C.U.P. |
| 150 grains SP | 760 | 54.0 | 2890 | 49,000 C.U.P. |
| 7mm Mauser | | | | |
| 125 grains SP | 760 | 48.7 | 2885 | 43,500 C.U.P. |
| 150 grains SP | 760 | 46.5 | 2660 | 43,500 C.U.P. |
| 175 grains SP | 760 | 44.0 | 2400 | 44,500 C.U.P. |
| 7mm-08 Remington | | | | |
| 120 grains SP | 760 | 48.0 | 2990 | 56,600 psi |
| 139 grains BT | 760 | 45.4 | 2725 | 50,800 psi |
| 150 grains SP | 760 | 45.6 | 2645 | 49,900 psi |
| 162 grains BT | 760 | 43.0 | 2605 | 58,100 psi |
| 162 grains BT | WMR | 43.8 | 2290 | 40,400 psi |
| 30 Carbine | | | | |
| 110 grains HSP | 680 | 16.0 | 1970 | 37,500 C.U.P. |
| 110 grains HSP | 296 | 15.0 | 1980 | 36,000 C.U.P. |
| 30 Remington | | | | |
| 170 grains SP | 748 | 30.0 | 2000 | 34,000 C.U.P. |
| 170 grains SP | 760 | 35.0 | 2095 | 35,000 C.U.P. |
| 303 Savage | | | | |
| 170 grains SP | 748 | 33.5 | 2090 | 32,000 C.U.P. |
| 30/30 Winchester | | | | |
| 110 grains HSP | 296 | 18.7 | 2155 | 36,000 C.U.P. |
| 110 grains HSP | 680 | 20.0 | 2200 | 36,000 C.U.P. |
| 110 grains HSP | 748 | 36.8 | 2595 | 33,000 C.U.P. |
| 150 grains SP | 748 | 34.5 | 2310 | 36,000 C.U.P. |
| 150 grains SP | 760 | 35.9 | 2090 | 30,000 C.U.P. |
| 170 grains SP | 748 | 32.0 | 2145 | 36,000 C.U.P. |
| 170 grains SP | 760 | 33.6 | 1975 | 30,000 C.U.P. |
| 300 Savage | | | | |
| 110 grains HSP | 748 | 45.2 | 2930 | 41,500 C.U.P. |
| 150 grains SP | 748 | 42.0 | 2600 | 41,000 C.U.P. |
| 150 grains SP | 760 | 45.5 | 2580 | 42,000 C.U.P. |
| 180 grains SP | 748 | 40.0 | 2375 | 43,000 C.U.P. |
| 180 grains SP | 760 | 44.5 | 2410 | 41,000 C.U.P. |
| 307 Winchester | | | | |
| 130 grains SP | 748 | 45.2 | 2720 | 38,000 C.U.P. |
| 130 grains SP | 760 | 45.2 | 2470 | 33,000 C.U.P. |
| 150 grains SP | 748 | 44.0 | 2625 | 44,500 C.U.P. |
| 150 grains SP | 760 | 44.0 | 2305 | 34,000 C.U.P. |
| 170 grains SP | 748 | 41.2 | 2455 | 44,000 C.U.P. |
| 170 grains SP | 760 | 41.2 | 2260 | 39,000 C.U.P. |
| 308 Winchester | | | | |
| 110 grains SP | 748 | 53.2 | 3300 | 46,000 C.U.P. |
| 125 grains SP | 748 | 52.0 | 3175 | 50,000 C.U.P. |
| 150 grains SP | 748 | 48.5 | 2865 | 48,000 C.U.P. |
| 150 grains SP | 760 | 50.1 | 2700 | 40,500 C.U.P. |
| 180 grains FMJBT | 748 | 45.5 | 2600 | 50,500 C.U.P. |
| 180 grains SP | 748 | 46.5 | 2610 | 48,500 C.U.P. |
| 180 grains FMJBT | 760 | 46.6 | 2535 | 43,000 C.U.P. |
| 180 grains SP | 760 | 48.0 | 2580 | 43,000 C.U.P. |
| 180 grains FS | 748 | 41.3 | 2420 | 54,900 psi |
| 190 grains HPBT | 748 | 42.0 | 2445 | 49,000 C.U.P. |
| 200 grains SP | 748 | 43.0 | 2435 | 50,000 C.U.P. |
| 200 grains SP | 760 | 45.7 | 2430 | 46,500 C.U.P. |

| Rifle Data (cont'd) | | | | |
|---------------------------------|--------|----------------------------|-----------------|---------------|
| Caliber Bullet Weight & Type | Powder | Charge Weight in Grains | Velocity fps | Pressure |
| 30/40 Krag | | | | |
| 180 grains SP | 760 | 44.5 | 2380 | 37,000 C.U.P. |
| 220 grains SP | 760 | 40.5 | 2070 | 36,000 C.U.P. |
| 30/06 Springfield | | | | |
| 110 grains PSP | 748 | 52.7 | 3230 | 47,000 C.U.P. |
| 110 grains PSP | 760 | 59.0 | 3210 | 45,500 C.U.P. |
| 125 grains SP | 748 | 51.0 | 3060 | 46,000 C.U.P. |
| 125 grains SP | 760 | 57.8 | 3125 | 45,000 C.U.P. |
| 150 grains SP | 748 | 48.0 | 2810 | 46,000 C.U.P. |
| 150 grains SP | 760 | 54.0 | 2900 | 48,000 C.U.P. |
| 168 grains HP | 760 | 52.5 | 2665 | 47,000 C.U.P. |
| 180 grains FMJBT | 748 | 44.0 | 2530 | 47,000 C.U.P. |
| 180 grains SP | 748 | 45.0 | 2540 | 48,500 C.U.P. |
| 180 grains FMJBT | 760 | 52.5 | 2700 | 48,500 C.U.P. |
| 180 grains SP | 760 | 53.0 | 2725 | 50,000 C.U.P. |
| 180 grains FS | 760 | 51.4 | 2625 | 57,100 psi |
| 190 grains HPBT | 760 | 52.0 | 2605 | 47,500 C.U.P. |
| 200 grains SP | 760 | 49.0 | 2470 | 46,000 C.U.P. |
| 200 grains SP | WMR | 55.7 | 2435 | 48,200 psi |
| 220 grains SP | 760 | 49.0 | 2370 | 48,000 C.U.P. |
| 220 grains SP | WMR | 55.7 | 2380 | 51,100 psi |
| 300 Winchester Magnum | | | | |
| 165 grains SP | 760 | 67.1 | 2995 | 60,800 psi |
| 165 grains SP | WMR | 76.0 | 3010 | 53,800 psi |
| 180 grains SP | WMR | 74.0 | 2960 | 60,300 psi |
| 190 grains SPBT | WMR | 74.0 | 2920 | 59,500 psi |
| 200 grains SP | WMR | 69.0 | 2750 | 59,000 psi |
| 220 grains SP | WMR | 68.2 | 2665 | 59,800 psi |
| 32 Winchester Special | | | | |
| 170 grains SP | 748 | 36.2 | 2240 | 32,500 C.U.P. |
| 8mm Mauser* | | | | |
| 170 grains SP* | 748* | 46.0 | 2410 | 37,000 C.U.P. |
| 170 grains SP* | 760* | 48.0 | 2240 | 32,000 C.U.P. |
| 338 Winchester Magnum* | | | | |
| 200 grains SP* | 760* | 70.0 | 2900 | 51,000 C.U.P. |
| 200 grains SP | WMR | 71.7 | 2660 | 43,400 psi |
| 220 grains SP | WMR | 72.2 | 2640 | 41,800 psi |
| 230 grains FS | WMR | 66.8 | 2450 | 44,900 psi |
| 250 grains SP* | 760* | 63.2 | 2545 | 50,500 C.U.P. |
| 250 grains SP | WMR | 72.0 | 2550 | 51,600 psi |
| 275 grains SP | WMR | 67.1 | 2390 | 50,800 psi |
| 300 grains SP* | 760* | 59.8 | 2285 | 51,500 C.U.P. |
| 35 Remington | | | | |
| 200 grains SP | 748 | 39.0 | 2130 | 33,000 C.U.P. |
| 356 Winchester | | | | |
| 220 grains SP | 748 | 42.1 | 2015 | 31,000 C.U.P. |
| 220 grains SP | 760 | 42.1 | 1805 | 27,500 C.U.P. |
| 358 Winchester | | | | |
| 200 grains SP | 748 | 50.6 | 2500 | 50,000 C.U.P. |
| 250 grains SP | 748 | 46.2 | 2250 | 50,500 C.U.P. |
| 375 H&H Magnum | | | | |
| 270 grains SP | 760 | 77.5 | 2660 | 51,000 C.U.P. |
| 300 grains SP | 760 | 77.5 | 2560 | 51,500 C.U.P. |
| 300 grains FMJ | 760 | 77.5 | 2560 | 51,500 C.U.P. |
| 44/40 Winchester | | | | |
| 200 grains Lead | 231 | 6.7 | 1100 | 12,000 psi |
| 458 Winchester Magnum | | | | |
| 500 grains FMJ | 748 | 73.0 | 2040 | 39,000 C.U.P. |
| 510 grains SP | 748 | 75.0 | 2065 | 41,000 C.U.P. |

CAUTION: Loads marked with asterisk (*) must be used approximately as shown. Reductions in powder charge not to exceed 10% or change in components should be made because such changes can cause dangerous pressures.

CENTERFIRE HANDGUN LOADING DATA

The data for the metallic cartridges contained in this handbook were obtained using Winchester® cases, primers and bullets. Any substitution of components other than bullets of the same size and weight from reputable manufacturers could alter the ballistic level and safety of these loads. We strongly urge when using this information use the components as shown.

Interpolation of additional loads from this data should not be attempted. Such practice can be dangerous.

Warning— Loads using 296 powder require heavy bullet pull (heavy crimp). 296 powder is not suitable with light bullets. The use of 296 powder with light bullet pull (light crimp) or lightweight bullets can cause squib loads. Such loads create a hazard to both the shooter and bystander as a bullet lodged in the barrel may cause the gun to burst if not removed before the next round is fired.

We have endeavored to show those applications for which BALL POWDER® smokeless propellant is most ideally suited. While other loads are certainly possible, the only way such loads can be developed is in a ballistic laboratory. We caution against the use of any other loads with Ball Powder smokeless propellant except where such loads have been adequately proven with the proper testing.

BLACK POWDER WARNING— Never substitute smokeless powder for black powder or Pyrodex or mix smokeless powder with black powder or Pyrodex. Never use smokeless powder in black powder firearms or in saluting cannons. Smokeless powder has much more energy than black powder or Pyrodex. Substituting or mixing powders may cause the firearm to blow up resulting in personal injury, property damage, or death.

Velocity

Velocities quoted in the tables are averages of a series of shots fired in accordance with equipment and techniques universally used throughout the American arms and ammunition industry. Listed loads have given uniform velocity results in our tests.

Handgun velocities quoted were measured in SAAMI* barrel lengths as listed.

*Sporting Arms and Ammunition Manufacturers Institute, Inc.

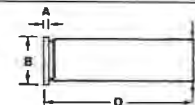
| Caliber | Barrel | Caliber | Barrel |
|-----------------------|--------|----------------------|--------|
| 256 Winchester | 8 1/2" | 38 S&W | 4" |
| 30 Luger | 4 1/2" | 380 Auto | 3 3/4" |
| 32 Auto | 4" | 38 ACP | 5" |
| 32 S&W | 3" | 38 Super Auto +P | 5" |
| 32 S&W Long | 4" | 40 S&W | 4" |
| 357 Magnum | 8 3/8" | 10mm Auto | 5" |
| 38 Special | 4" | 41 Magnum | 8 3/8" |
| 9mm Luger | 4" | 44 S&W Special | 6 1/2" |
| 9mm Winchester Magnum | 5" | 44 Magnum | 6 1/2" |
| | | 45 Auto | 5" |
| | | 45 Colt | 5 1/2" |
| | | 45 Winchester Magnum | 5" |

Handgun Case Dimensions

| Rimless Handgun Cases | | | | | |
|--------------------------|--------------------|-------|-------|--------|----------------|
| Caliber | Maximum Dimensions | | | | Trim To Length |
| | A | B | C* | D | |
| 30 Luger | .048" | .393" | .332" | .850" | .845" |
| 32 Auto | .045" | .358" | .336" | .680" | .672" |
| 9mm Luger | .050" | .394" | .380" | .754" | .751" |
| 9mm Winchester Magnum | .050" | .394" | .379" | 1.161" | 1.155" |
| 38 ACP and Super Auto +P | .050" | .406" | .384" | .900" | .895" |
| 380 Auto | .045" | .374" | .373" | .680" | .677" |
| 40 S&W | .055" | .424" | .423" | .850" | .847" |
| 10mm Auto | .035" | .425" | .423" | .992" | .989" |
| 45 Auto | .049" | .480" | .473" | .898" | .895" |
| 45 Winchester Magnum | .049" | .480" | .473" | 1.198" | 1.193" |

*This dimension is with bullet seated.

Rimmed Handgun Cases



| Caliber | Maximum Dimensions | | | | Trim To Length |
|--------------------|--------------------|-------|-------|--------|----------------|
| | A | B | C* | D | |
| 256 Winchester | .060" | .440" | .285" | 1.281" | 1.275" |
| 32 S&W | .055" | .378" | .339" | .605" | .600" |
| 32 S&W Long | .055" | .375" | .337" | .920" | .915" |
| 357 Magnum | .060" | .440" | .379" | 1.290" | 1.285" |
| 357 Remington Max. | .060" | .440" | .379" | 1.605" | 1.600" |
| 38 S&W | .055" | .440" | .385" | .775" | .765" |
| 38 Special | .058" | .440" | .379" | 1.155" | 1.149" |
| 41 Magnum | .059" | .442" | .434" | 1.290" | 1.285" |
| 44 S&W Special | .060" | .514" | .456" | 1.160" | 1.152" |
| 44 Magnum | .060" | .514" | .456" | 1.285" | 1.280" |
| 45 Colt | .060" | .512" | .480" | 1.285" | 1.280" |

*This dimension is with bullet seated.

| Maximum Overall Lengths with Bullet Seated | | | |
|--|--------|----------------------|--------|
| Caliber | Length | Caliber | Length |
| 256 Winchester Magnum | 1.590" | 38 ACP | 1.280" |
| 30 Luger | 1.175" | 38 Super Auto +P | 1.280" |
| 32 S&W | .930" | 38 Special | 1.550" |
| 32 Auto | .984" | 38 S&W | 1.180" |
| 32 S&W Long | 1.280" | 40 S&W | 1.135" |
| 9mm Luger | 1.169" | 10mm Auto | 1.260" |
| 9mm Winchester Magnum | 1.575" | 41 Magnum | 1.590" |
| 357 Magnum | 1.590" | 44 S&W Special | 1.615" |
| 357 Remington Max. | 1.990" | 44 Remington Magnum | 1.610" |
| 380 Auto | .984" | 45 Auto | 1.275" |
| | | 45 Colt | 1.600" |
| | | 45 Winchester Magnum | 1.575" |

| Bullet Descriptions | | | |
|---------------------|---------------------|--------------|--------------------------|
| Abbreviation | Description | Abbreviation | Description |
| JSP | Jacketed Soft Point | HSP | Hollow Soft Point |
| FMJ | Full Metal Jacket | JSWC | Jacketed Semi-Wad Cutter |
| FPJ | Full Plated Jacket | SWC | Lead Semi-Wad Cutter |
| WC | Wad Cutter | JHP | Jacketed Hollow Point |

| Nominal Bullet Diameters | | | |
|-----------------------------|-------|---------------------|-------|
| Jacketed | Dia. | Lead | Dia. |
| 256 Winchester | .257" | 32 S&W | .314" |
| 30 Luger | .309" | 32 S&W Long | .314" |
| 32 Auto | .312" | 9mm Luger | .355" |
| 9mm Luger | .355" | 357 Magnum | .358" |
| 9mm Winchester Magnum | .355" | 38 S&W | .358" |
| 357 Magnum & Remington Max. | .356" | 38 Special | .358" |
| 38 Special | .356" | 40 S&W | .400" |
| 380 Auto | .356" | 10mm Auto | .400" |
| 38 ACP and Super Auto +P | .356" | 44 S&W Special | .430" |
| 41 Magnum | .410" | 44 Remington Magnum | .430" |
| 44 Remington Magnum | .430" | 45 Auto | .452" |
| 45 Auto | .451" | 45 Colt | .455" |
| 45 Winchester Magnum | .452" | | |

| Handgun Data | | | | |
|---------------------------------|--------|----------------------------|-------------------|------------|
| Caliber Bullet Weight & Type | Powder | Charge Weight in Grains | Velocity (fps) | Pressure |
| 30 Luger | | | | |
| 93 grains FMJ | 231 | 4.2 | 1085 | 25,500 cup |
| 32 S&W | | | | |
| 85 grains Lead | 231 | 1.4 | 595 | 9,500 cup |
| 32 Auto | | | | |
| 71 grains FMJ | 231 | 2.5 | 865 | 14,000 cup |
| 32 S&W Long | | | | |
| 98 grains Lead | 231 | 2.4 | 765 | 11,000 cup |
| 38 Smith & Wesson | | | | |
| 145 grains Lead | 231 | 2.6 | 675 | 11,500 cup |
| 380 Auto | | | | |
| 95 grains FMJ | 231 | 3.2 | 860 | 15,000 cup |
| 38 Auto | | | | |
| 130 grains FMJ | 231 | 4.4 | 875 | 20,000 cup |

| Handgun Data-38 Super Auto +P | | | | | | | | | | | | | | | |
|-------------------------------|-----------------------|-------------------|-------------------|-----------------------|-------------------|-------------------|-----------------------|-------------------|-------------------|-----------------------|-------------------|-------------------|-----------------------|-------------------|-------------------|
| Bullet Wt. and Type | 231 | | | 540 | | | WSL | | | WSF | | | WAP | | |
| | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) |
| 115 gr. JHP | 5.0 | 1080 | 25,500 | 7.8 | 1185 | 26,400 | 4.8 | 1090 | 25,300 | 6.0 | 1185 | 28,100 | 6.6 | 1190 | 26,500 |
| | 5.9 | 1230 | 34,200 | 8.5 | 1320 | 34,300 | 5.9 | 1260 | 34,500 | 7.1 | 1320 | 34,400 | 7.8 | 1340 | 34,300 |
| 124 gr. FMJ | 4.9 | 1060 | 27,500 | 7.3 | 1110 | 26,200 | 4.6 | 1040 | 25,600 | 5.2 | 1060 | 25,800 | 6.2 | 1150 | 27,500 |
| | 5.7 | 1185 | 34,600 | 8.3 | 1260 | 34,600 | 5.6 | 1210 | 34,200 | 6.6 | 1245 | 34,600 | 7.3 | 1270 | 34,300 |
| 130 gr. FMJ | 4.8 | 1020 | 26,300 | 6.8 | 1065 | 25,600 | 4.6 | 1030 | 25,300 | 5.4 | 1065 | 26,100 | 6.3 | 1120 | 27,600 |
| | 5.6 | 1145 | 34,800 | 8.0 | 1225 | 34,600 | 5.6 | 1160 | 34,100 | 6.3 | 1200 | 34,400 | 7.3 | 1250 | 34,600 |
| 147 gr. JHP | 4.4 | 930 | 28,500 | 6.3 | 975 | 26,400 | 4.3 | 930 | 27,300 | 4.8 | 960 | 27,300 | 5.5 | 990 | 27,200 |
| | 4.9 | 1010 | 34,900 | 7.2 | 1115 | 34,000 | 4.8 | 1020 | 34,400 | 5.6 | 1070 | 34,400 | 6.3 | 1110 | 34,500 |
| 160 gr. Lead | 3.5 | 860 | 27,300 | 5.1 | 905 | 26,000 | 3.6 | 900 | 29,100 | 3.8 | 875 | 25,300 | 4.6 | 930 | 26,100 |
| | 4.2 | 955 | 34,400 | 6.0 | 1030 | 34,300 | 4.2 | 975 | 34,800 | 4.9 | 1010 | 34,600 | 5.5 | 1035 | 34,200 |

| Handgun Data-38 Special | | | | | | | | | | | | |
|-----------------------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|
| | 231 | | | 540 | | | 571 | | | WST | | |
| Bullet Wt. and Type | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) |
| 148 gr. Lead Hollow Base WC | 2.9 | 690 | 12,400 | 4.6 | 720 | 12,100 | - | - | - | 2.5 | 680 | 13,000 |
| | 3.3 | 770 | 16,100 | 5.1 | 800 | 15,300 | - | - | - | 2.8 | 735 | 16,000 |
| 148 gr. Lead Bevel Base WC | 3.0 | 690 | 12,600 | 4.7 | 700 | 13,100 | - | - | - | 2.5 | 665 | 13,100 |
| | 3.4 | 760 | 16,400 | 5.2 | 785 | 16,300 | - | - | - | 2.7 | 700 | 16,300 |
| 158 gr. Lead SWC | 4.0 | 745 | 12,600 | 6.2 | 805 | 13,200 | 6.7 | 795 | 13,300 | 3.3 | 705 | 12,800 |
| | 4.5 | 830 | 15,800 | 6.8 | 880 | 15,900 | 7.4 | 875 | 16,000 | 3.7 | 770 | 15,700 |

| Handgun Data-38 Special (+P)* | | | | | | | | | | | | |
|-------------------------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|
| | 231 | | | 540 | | | 571 | | | WST | | |
| Bullet Wt. and Type | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) |
| 110 gr. JHP | 5.3 | 935 | 14,700 | 8.2 | 1005 | 14,900 | - | - | - | - | - | - |
| | 5.7 | 1015 | 17,600 | 8.7 | 1070 | 17,800 | - | - | - | - | - | - |
| 125 gr. JHP | 4.8 | 840 | 14,100 | 7.8 | 945 | 15,800 | - | - | - | - | - | - |
| | 5.3 | 935 | 17,200 | 8.2 | 1000 | 17,500 | - | - | - | - | - | - |
| 140 gr. JHP | 4.3 | 685 | 13,900 | 7.0 | 785 | 15,200 | 7.4 | 785 | 14,600 | - | - | - |
| | 4.8 | 785 | 17,200 | 7.4 | 875 | 17,300 | 8.0 | 890 | 17,300 | - | - | - |
| 158 gr. JHP | 4.0 | 635 | 13,900 | 6.1 | 750 | 15,300 | 6.6 | 700 | 14,100 | - | - | - |
| | 4.4 | 720 | 17,200 | 6.6 | 800 | 17,400 | 7.3 | 800 | 17,400 | - | - | - |
| 158 gr. Lead SWC | - | - | - | - | - | - | - | - | - | - | - | - |
| | 4.7 | 860 | 17,100 | 7.1 | 915 | 17,300 | 7.7 | 910 | 17,300 | 3.9 | 800 | 17,300 |

* Designated (+P) loads are higher pressure loads to give greater velocities. These loads should be used only in firearms recommended for (+P) type cartridges by the firearms manufacturer. Continuous use of (+P) loads in firearms with aluminum frames or cylinders or with light weight steel frames or cylinders is not recommended. If doubt exists check with the gun manufacturer.

Handgun Data- 9mm Luger

| Bullet Wt. and Type | 231 | | | 540 | | | 571 | | |
|--------------------------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|
| | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) |
| 95 gr. FMJ | 4.6 | 1145 | 27,100 | 6.6 | 1145 | 28,600 | 7.3 | 1165 | 26,400 |
| | 5.1 | 1235 | 32,600 | 7.1 | 1245 | 33,100 | 8.3 | 1290 | 33,200 |
| 114 gr. Lead Cast Conical Nose | 3.8 | 1010 | 26,900 | 5.6 | 1050 | 28,400 | - | - | - |
| | 4.2 | 1115 | 32,500 | 6.2 | 1125 | 33,000 | - | - | - |
| 115 gr. FMJ | 4.4 | 1045 | 25,900 | 6.1 | 1040 | 28,300 | 7.0 | 1080 | 27,100 |
| | 4.9 | 1135 | 32,600 | 6.7 | 1135 | 33,400 | 7.6 | 1180 | 33,000 |
| 115 gr. JHP | 4.3 | 1010 | 25,800 | 6.1 | 1050 | 28,600 | 6.9 | 1060 | 27,000 |
| | 4.8 | 1120 | 32,100 | 6.6 | 1130 | 33,400 | 7.7 | 1185 | 32,900 |
| 124 gr. Lead Round Nose | 3.3 | 910 | 23,800 | 5.0 | 950 | 28,400 | - | - | - |
| | 4.0 | 1035 | 32,900 | 5.7 | 1050 | 33,500 | - | - | - |
| 124 gr. FMJ | 4.2 | 1005 | 28,800 | 5.6 | 1000 | 29,200 | 6.8 | 1035 | 27,800 |
| | 4.5 | 1060 | 32,700 | 6.1 | 1065 | 32,900 | 7.2 | 1085 | 30,600 |
| 147 gr. Lead Cast Flat Point | 3.3 | 865 | 29,000 | 4.5 | 840 | 26,900 | 5.4 | 895 | 27,500 |
| | 3.5 | 905 | 32,100 | 5.0 | 925 | 32,500 | 5.9 | 970 | 32,700 |
| 147 gr. FMJ | - | - | - | 4.7 | 855 | 30,600 | 5.5 | 880 | 27,200 |
| | - | - | - | 5.1 | 890 | 33,300 | 6.0 | 960 | 33,000 |
| 147 gr. JHP | - | - | - | 4.3 | 800 | 30,200 | 5.5 | 900 | 29,800 |
| | - | - | - | 4.8 | 885 | 33,300 | 5.8 | 935 | 32,800 |

Handgun Data- 357 Magnum

| Bullet Weight & Type | Powder | Charge Weight in Grains | Velocity (fps) | Pressure |
|----------------------|--------|-------------------------|----------------|------------|
| 110 grains JHP | 231 | 8.8 | 1575 | 42,500 cup |
| 125 grains JHP | 231 | 8.1 | 1460 | 42,500 cup |
| 125 grains JHP* | 296* | 18.5 | 1800 | 32,500 cup |
| 148 grains WC | 231 | 3.4 | 880 | 19,500 cup |
| 150 grains Lead | 231 | 6.9 | 1305 | 42,000 cup |
| 150 grains Lead* | 296* | 14.0 | 1510 | 32,000 cup |
| 158 grains JHP | 231 | 6.9 | 1260 | 42,000 cup |
| 158 grains Lead | 231 | 6.7 | 1275 | 42,500 cup |
| 158 grains Lead* | 296* | 14.5 | 1560 | 38,000 cup |
| 158 grains JHP* | 296* | 16.6 | 1610 | 39,500 cup |
| 170 grains FMJ* | 296* | 14.3 | 1390 | 42,000 cup |
| 200 grains Lead | 231 | 5.5 | 1060 | 42,500 cup |
| 200 grains Lead* | 296* | 12.4 | 1335 | 35,000 cup |

Handgun Data- 40 Cal. Smith & Wesson

| Bullet Wt. and Type | 231 | | | 540 | | | 571 | | |
|---------------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|
| | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) |
| 150 gr. JHP | 5.2 | 970 | 21,800 | 7.7 | 1055 | 26,100 | 9.5 | 1130 | 27,200 |
| | 6.3 | 1150 | 33,200 | 8.6 | 1175 | 33,000 | 10.4 | 1230 | 33,200 |
| 155 gr. JHP | 5.1 | 950 | 23,200 | 7.7 | 1040 | 26,700 | 8.5 | 1020 | 24,700 |
| | 6.0 | 1100 | 33,200 | 8.5 | 1140 | 33,100 | 10.0 | 1180 | 33,200 |
| 170 gr. JHP | 4.5 | 860 | 24,000 | 7.0 | 970 | 26,200 | 7.6 | 900 | 22,500 |
| | 5.3 | 1000 | 33,200 | 7.7 | 1075 | 33,400 | 8.8 | 1080 | 33,200 |
| 170 gr. Lead | 4.0 | 850 | 22,800 | 6.3 | 945 | 25,800 | 7.0 | 900 | 24,100 |
| | 5.2 | 1030 | 33,200 | 7.2 | 1060 | 33,200 | 8.4 | 1070 | 33,200 |
| 180 gr. JHP | 4.0 | 790 | 23,700 | 6.2 | 895 | 26,300 | 6.8 | 830 | 23,200 |
| | 5.0 | 950 | 33,200 | 6.9 | 985 | 32,800 | 7.8 | 950 | 29,500 |
| 200 gr. FMJ | 4.0 | 750 | 26,600 | 5.7 | 835 | 27,200 | 6.6 | 790 | 26,000 |
| | 4.7 | 850 | 33,200 | 6.4 | 905 | 32,800 | 7.5 | 910 | 33,200 |
| 200 gr. Lead | 3.0 | 700 | 21,100 | 4.7 | 775 | 26,300 | 5.0 | 740 | 20,600 |
| | 4.0 | 850 | 33,200 | 5.3 | 855 | 32,900 | 6.5 | 900 | 33,200 |

Handgun Data- 9mm Luger

| Bullet Wt. and Type | WSL | | | WSF | | | WAP | | |
|--------------------------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|
| | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) |
| 95 gr. FMJ | 4.3 | 1100 | 27,700 | - | - | - | 5.6 | 1140 | 29,100 |
| | 4.8 | 1195 | 32,700 | - | - | - | 6.4 | 1285 | 33,000 |
| 114 gr. Lead Cast Conical Nose | 3.8 | 965 | 28,500 | - | - | - | 4.8 | 1040 | 26,200 |
| | 4.1 | 1050 | 32,700 | - | - | - | 5.7 | 1160 | 33,200 |
| 115 gr. FMJ | 4.2 | 985 | 29,500 | 4.9 | 1060 | 24,200 | 5.3 | 1055 | 27,200 |
| | - | - | - | 5.3 | 1135 | 28,300 | - | - | - |
| | 4.6 | 1075 | 33,200 | 5.7 | 1195 | 31,900 | 6.0 | 1155 | 33,100 |
| 115 gr. JHP | 4.1 | 1050 | 29,500 | 5.2 | 1095 | 28,700 | 5.3 | 1065 | 28,500 |
| | 4.5 | 1105 | 33,600 | 5.7 | 1165 | 32,100 | 5.8 | 1150 | 33,200 |
| 124 gr. Lead Round Nose | 3.4 | 920 | 29,200 | 4.0 | 945 | 22,200 | 4.4 | 955 | 25,900 |
| | 3.8 | 985 | 33,500 | 4.7 | 1055 | 27,300 | 5.1 | 1080 | 33,200 |
| 124 gr. FMJ | 3.8 | 970 | 29,200 | 4.7 | 1015 | 27,700 | 4.9 | 1005 | 28,000 |
| | 4.1 | 1025 | 32,600 | 5.3 | 1115 | 32,700 | 5.6 | 1105 | 33,300 |
| 147 gr. Lead Cast Flat Point | - | - | - | 3.7 | 905 | 28,500 | 3.9 | 845 | 24,600 |
| | - | - | - | 4.1 | 965 | 32,800 | 4.7 | 985 | 33,100 |
| 147 gr. FMJ | - | - | - | 3.9 | 895 | 28,400 | 4.2 | 880 | 29,200 |
| | - | - | - | 4.3 | 950 | 32,300 | 4.6 | 940 | 33,200 |
| 147 gr. JHP | - | - | - | 4.0 | 900 | 30,100 | 4.0 | 865 | 29,300 |
| | - | - | - | 4.3 | 935 | 32,300 | 4.4 | 920 | 33,300 |

Handgun Data- 357 Remington Maximum

| Bullet Weight & Type | Powder | Charge Weight in Grains | Velocity (fps) | Pressure |
|--|--------|-------------------------|----------------|------------|
| (Note: Use small rifle primers with these loads) | | | | |
| 158 grains JSP | 680 | 23.4 | 1780 | 34,400 cup |
| 180 grains FMJ* | 296* | 19.0 | 1670 | 46,900 cup |
| 180 grains FMJ | 680 | 19.7 | 1550 | 38,300 cup |

*Note: 296 powder is considered to be one of the best powders for use in magnum revolver cartridges. Recommended for these loads are the use of a Winchester or magnum primer and a very heavy crimp (high bullet pull). Failure to follow this procedure could result in poor ignition and/or squib loads under extreme circumstances, particularly in loads where less than 90% of the available powder space is being used (low loading density). Do not reduce powder charges with 296 powder. These loads must be used exactly as shown. A reduction in powder charge or change in components can cause dangerous pressures.

Handgun Data- 40 Cal. Smith & Wesson

| Bullet Wt. and Type | WST | | | WSL | | | WSF | | | WAP | | |
|---------------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|
| | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) |
| 150 gr. JHP | 5.5 | 990 | 23,900 | 4.6 | 930 | 20,600 | 6.7 | 1100 | 26,200 | 7.0 | 1110 | 27,300 |
| | 6.3 | 1050 | 27,100 | 5.8 | 1140 | 33,200 | 7.7 | 1200 | 33,200 | 7.5 | 1190 | 32,800 |
| 155 gr. JHP | 5.5 | 980 | 24,000 | 4.5 | 930 | 21,600 | 6.0 | 1010 | 21,600 | 6.9 | 1100 | 28,300 |
| | 6.0 | 1040 | 27,900 | 5.6 | 1100 | 33,200 | 7.3 | 1180 | 33,200 | 7.4 | 1170 | 33,500 |
| 170 gr. JHP | 4.2 | 830 | 22,100 | 4.2 | 860 | 24,000 | 5.5 | 920 | 23,300 | 6.2 | 1020 | 28,000 |
| | 5.5 | 970 | 30,100 | 5.0 | 1000 | 33,200 | 6.5 | 1080 | 33,200 | 6.7 | 1085 | 33,500 |
| 170 gr. Lead | 4.0 | 870 | 22,800 | 4.3 | 940 | 28,700 | 5.2 | 950 | 23,500 | 5.7 | 980 | 25,700 |
| | 5.0 | 970 | 30,000 | 4.8 | 1030 | 33,200 | 6.2 | 1090 | 33,200 | 6.4 | 1075 | 33,400 |
| 180 gr. JHP | 4.0 | 780 | 21,800 | 4.0 | 830 | 26,300 | 5.0 | 860 | 22,900 | 5.5 | 920 | 25,000 |
| | 5.0 | 900 | 28,100 | 4.8 | 950 | 33,200 | 5.6 | 950 | 28,300 | 6.2 | 1020 | 33,200 |
| 200 gr. FMJ | 3.8 | 740 | 24,200 | 3.8 | 760 | 27,600 | 4.9 | 840 | 25,600 | 4.8 | 800 | 23,800 |
| | 4.5 | 810 | 29,900 | 4.4 | 850 | 33,200 | 5.7 | 930 | 33,200 | 5.6 | 920 | 32,600 |
| 200 gr. Lead | - | - | - | 3.0 | 710 | 21,800 | 3.9 | 785 | 21,800 | 4.2 | 795 | 25,600 |
| | 3.5 | 760 | 25,200 | 3.9 | 860 | 33,200 | 5.0 | 920 | 33,200 | 4.9 | 900 | 33,000 |

Handgun Data- 10mm Auto

| Bullet Wt. and Type | 231 | | | 296* | | | 540 | | |
|---------------------|-----------------|----------------|------------------|-----------------|----------------|----------------|-----------------|----------------|------------------|
| | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) |
| 150 gr. JHP | 8.0 7.0 | 1090 1210 | 29,000 35,600 | - | - | - | 8.7 10.6 | 1105 1330 | 25,000 35,600 |
| 155 gr. JHP | 5.8 7.3 | 1040 1250 | 23,300 35,600 | - | - | - | 9.3 10.8 | 1165 1355 | 25,600 35,400 |
| 170 gr. Lead | 4.8 5.6 | 980 1100 | 26,400 35,600 | - | - | - | 8.2 9.3 | 1120 1245 | 25,500 35,400 |
| 170 gr. JHP | 4.7 6.3 | 880 1120 | 20,600 35,600 | - | - | - | 8.7 9.9 | 1105 1265 | 25,500 35,500 |
| 180 gr. JHP | 5.2 5.8 | 950 1050 | 29,600 35,600 | - | - | - | 8.0 9.3 | 1040 1190 | 25,100 35,500 |
| 190 gr. FMJ | 4.6 5.9 | 800 1030 | 22,000 35,600 | 12.6 | 990 | 22,400 | 8.0 9.3 | 1030 1175 | 25,900 35,400 |
| 200 gr. Lead | 4.2 5.5 | 870 1030 | 24,200 35,600 | - | - | - | 6.6 7.6 | 960 1085 | 26,300 35,600 |
| 200 gr. FMJ | 4.6 5.6 | 840 1000 | 24,600 35,600 | - | - | - | 7.5 8.6 | 960 1090 | 26,600 35,600 |

* See note on page 51.

| Bullet Weight & Type | Powder | Charge Weight in Grains | Velocity (fps) | Pressure |
|--|--------|-------------------------|----------------|------------|
| Handgun Data- 41 Magnum | | | | |
| 210 grains Lead | 231 | 7.4 | 1125 | 28,000 cup |
| 210 grains JSP | 231 | 8.8 | 1220 | 38,000 cup |
| 210 grains JSP* | 296* | 20.4 | 1460 | 24,000 cup |
| Handgun Data- 44 Smith & Wesson Special | | | | |
| 246 grains Lead | 231 | 5.4 | 795 | 12,500 cup |
| Handgun Data- 45 Colt | | | | |
| 255 grains Lead | 231 | 7.1 | 875 | 13,000 cup |

* See note on page 51.

Handgun Data- 45 ACP

| Bullet Wt. and Type | 231 | | | 540 | | | 571 | | |
|-------------------------|-----------------|----------------|------------------|-----------------|----------------|------------------|-----------------|----------------|------------------|
| | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) |
| 154 gr. Lead | - | - | - | 8.5 9.6 | 940 1060 | 14,700 19,800 | - | - | - |
| 180 gr. Lead Cast SWC | 5.3 6.3 | 885 1020 | 15,300 20,000 | 8.0 9.0 | 880 980 | 15,900 20,300 | - | - | - |
| 185 gr. JSWC | 5.1 6.1 | 760 920 | 13,300 18,600 | 8.0 9.0 | 825 950 | 15,700 20,000 | - | - | - |
| 185 gr. JHP | 6.2 6.8 | 915 990 | 17,200 19,500 | 9.1 10.0 | 905 1015 | 16,800 20,300 | 10.3 11.3 | 935 1045 | 16,800 19,400 |
| 200 gr. Lead Cast SWC | 4.8 5.5 | 800 910 | 14,900 19,600 | 7.2 8.3 | 805 925 | 15,600 20,000 | 8.5 9.5 | 835 945 | 15,300 19,500 |
| 200 gr. FPJ | 5.4 6.1 | 815 920 | 16,200 19,900 | 8.1 8.9 | 825 925 | 16,600 20,000 | 9.2 10.2 | 850 960 | 15,600 19,900 |
| 200 gr. JHP | 5.3 5.8 | 830 905 | 16,200 19,500 | 7.8 8.5 | 810 895 | 16,600 19,900 | 9.0 9.8 | 860 945 | 16,600 20,000 |
| 230 gr. Lead Round Nose | 4.5 5.1 | 765 870 | 15,500 19,800 | 6.9 7.6 | 750 860 | 14,300 19,700 | 7.7 8.7 | 800 890 | 15,900 19,800 |
| 230 gr. FMJ | 4.9 5.7 | 695 830 | 14,900 19,200 | 7.4 8.1 | 745 830 | 16,100 19,800 | - | - | - |
| 230 gr. JHP | 4.8 5.1 | 740 785 | 18,000 20,000 | 6.9 7.6 | 715 800 | 17,200 19,900 | 8.4 8.9 | 795 845 | 18,400 19,900 |

Metallic Handgun

50

Handgun Data- 10mm Auto

| Bullet Wt. and Type | 571 | | | WST | | | WSL | | | WSF | | | WAP | | |
|---------------------|-----------------|----------------|------------------|-----------------|----------------|------------------|-----------------|----------------|------------------|-----------------|----------------|------------------|-----------------|----------------|------------------|
| | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) |
| 150 gr. JHP | 9.5 11.4 | 1130 1330 | 25,200 35,600 | 5.5 7.0 | 1080 1190 | 30,200 34,000 | 5.5 6.3 | 1110 1210 | 28,200 35,600 | 6.5 8.1 | 1090 1310 | 24,700 35,600 | 8.7 9.8 | 1290 1385 | 28,700 35,500 |
| 155 gr. JHP | 9.7 12.0 | 1110 1350 | 23,100 35,300 | 5.0 8.0 | 1000 1220 | 23,100 31,900 | 5.4 6.9 | 1050 1250 | 23,500 35,600 | 6.8 8.4 | 1100 1320 | 23,000 35,600 | 8.8 9.7 | 1265 1355 | 29,800 35,400 |
| 170 gr. Lead | 8.5 10.5 | 1040 1250 | 23,600 35,600 | - | - | - | 3.5 5.2 | 830 1100 | 20,000 35,600 | 5.5 6.6 | 1020 1170 | 25,700 35,600 | 7.4 8.4 | 1180 1270 | 29,200 35,300 |
| 170 gr. JHP | 9.0 10.8 | 1060 1240 | 25,300 35,600 | 4.5 5.5 | 940 1020 | 26,200 29,500 | 4.1 6.0 | 850 1130 | 20,000 35,600 | 6.0 7.5 | 1020 1210 | 24,000 35,600 | 7.9 9.1 | 1165 1285 | 27,800 34,600 |
| 180 gr. JHP | 8.3 10.2 | 950 1170 | 23,100 35,600 | 5.0 5.5 | 950 1010 | 30,500 35,200 | 4.8 5.6 | 950 1060 | 28,400 35,600 | 5.7 7.1 | 950 1150 | 25,000 35,600 | 7.5 8.4 | 1110 1210 | 27,200 34,400 |
| 190 gr. FMJ | 8.5 10.1 | 940 1140 | 24,100 35,600 | - | - | - | 4.5 5.7 | 860 1040 | 24,400 35,600 | 5.5 7.1 | 880 1120 | 22,000 35,600 | 7.4 8.3 | 1100 1185 | 27,800 34,700 |
| 200 gr. Lead | 7.5 9.0 | 950 1110 | 24,200 35,600 | 3.8 5.0 | 830 940 | 23,900 32,400 | 3.8 4.9 | 850 990 | 23,600 35,600 | 5.0 6.3 | 920 1080 | 23,500 35,600 | 5.8 6.9 | 975 1080 | 27,500 35,200 |
| 200 gr. FMJ | 8.3 9.3 | 960 1070 | 27,500 35,600 | - | - | - | 4.0 4.6 | 800 890 | 25,000 35,600 | 5.2 6.2 | 880 1020 | 26,200 35,600 | 6.9 7.8 | 1025 1115 | 27,200 35,700 |

Handgun Data- 44 Remington Magnum

| Bullet Weight & Type | Powder | Charge Weight in Grains | Velocity (fps) | Pressure |
|----------------------|--------|-------------------------|----------------|------------|
| 210 grains JHP | 231 | 11.7 | 1385 | 38,000 cup |
| 240 grains Lead SWC | 231 | 11.0 | 1285 | 38,000 cup |
| 240 grains HSP | 231 | 11.2 | 1280 | 38,000 cup |
| 240 grains Lead SWC* | 296* | 25.0 | 1560 | 37,500 cup |
| 240 grains HSP* | 296* | 24.0 | 1430 | 38,000 cup |

*Note: 296 powder is considered to be one of the best powders for use in magnum revolver cartridges. Recommended for these loads are the use of a Winchester or magnum primer and a very heavy crimp (high bullet pull).

Failure to follow this procedure could result in poor ignition and/or squib loads under extreme circumstances, particularly in loads where less than 90% of the available powder space is being used (low loading density).

Do not reduce powder charges with 296 powder. These loads must be used exactly as shown. A reduction in powder charge or change in components can cause dangerous pressures.

Handgun Data- 45 ACP

| Bullet Wt. and Type | WST | | | WSL | | | WSF | | | WAP | | |
|-------------------------|-----------------|----------------|------------------|-----------------|----------------|------------------|-----------------|----------------|------------------|-----------------|----------------|------------------|
| | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) | Chg. Wt. (grs.) | Velocity (fps) | Pressure (psi) |
| 154 gr. Lead | - | - | - | 5.5 6.4 | 940 1085 | 14,800 19,900 | - | - | - | 8.2 9.0 | 1035 1135 | 15,900 19,700 |
| 180 gr. Lead Cast SWC | 4.6 5.4 | 880 1000 | 16,200 20,000 | 5.0 5.9 | 865 990 | 14,800 19,800 | 6.6 7.4 | 960 1060 | 15,900 20,000 | 7.5 8.3 | 940 1055 | 14,900 20,000 |
| 185 gr. JSWC | 4.3 5.3 | 745 890 | 13,400 19,000 | 4.9 5.9 | 775 935 | 14,400 20,000 | 6.0 7.0 | 775 950 | 12,800 17,600 | 7.2 8.1 | 865 1000 | 14,900 20,000 |
| 185 gr. JHP | 5.1 5.6 | 875 935 | 17,100 19,800 | 5.8 6.5 | 900 980 | 16,900 19,700 | 7.2 7.9 | 920 1035 | 15,600 19,700 | 8.3 8.9 | 970 1045 | 17,100 19,900 |
| 200 gr. Lead Cast SWC | 4.4 5.1 | 830 910 | 15,400 19,900 | 4.3 5.4 | 755 910 | 13,700 19,800 | 6.0 6.7 | 870 970 | 15,200 19,400 | 6.6 7.6 | 850 970 | 14,900 19,700 |
| 200 gr. FPJ | 4.7 5.3 | 825 890 | 16,400 20,000 | 5.0 5.9 | 790 920 | 15,600 20,100 | 6.5 7.3 | 870 980 | 15,500 19,400 | 7.0 8.0 | 825 965 | 15,000 19,400 |
| 200 gr. JHP | 4.7 5.2 | 820 885 | 16,900 19,900 | 4.7 5.4 | 770 875 | 15,500 19,600 | 6.6 7.1 | 870 970 | 15,500 19,500 | 7.0 7.7 | 855 965 | 15,200 20,100 |
| 230 gr. Lead Round Nose | 4.0 4.5 | 750 805 | 16,200 20,100 | 4.2 4.8 | 745 840 | 15,100 19,800 | 5.5 6.2 | 820 910 | 15,200 19,600 | 6.6 7.3 | 845 915 | 16,600 19,600 |
| 230 gr. FMJ | 4.1 4.9 | 710 800 | 15,500 19,900 | 4.7 5.3 | 735 835 | 15,900 19,800 | 5.7 6.6 | 755 885 | 14,900 19,200 | 6.8 7.4 | 820 885 | 16,800 19,600 |
| 230 gr. JHP | - | - | - | 4.4 4.8 | 705 770 | 16,800 19,900 | 5.7 6.1 | 780 850 | 16,500 19,600 | 6.1 6.6 | 760 835 | 16,200 20,200 |

51

Metallic Handgun

BALLISTIC TERMS AND DEFINITIONS

ACCURACY In firearms using single projectiles, the measure of the dispersion of the group fired. The optimum would be one hole no larger in diameter than a single projectile.

ACTION The combination of the receiver or frame and breech bolt together with the other parts of the mechanism by which a firearm is loaded, fired and unloaded.

AUTOMATIC A term commonly used for a self-loading firearm. A firearm is truly automatic only when it continues to fire as long as the trigger is held back.

BALLISTIC, EXTERIOR The theory of the motion of the projectile from the gun to the target.

BALLISTICS, INTERIOR The theory of the motion of the projectile in the firearm.

BALLISTICS, TERMINAL That branch of ballistics which deals with the effects of projectiles at the target.

BORE The hole through the barrel of a firearm. In a rifle the bore is the hole after it has been drilled and reamed, and before rifling; that is, the bore diameter measuring to the top of the opposite lands. The groove diameter is the diameter to the bottom of opposite grooves. See Choke.

BREECH The rear end of the bore of a firearm where the cartridge is inserted into the chamber.

BULLET The projectile fired from a rifle or handgun.

CALIBER The nominal diameter of the bore of a rifle or handgun. In America and England it is expressed in decimals of an inch, and in Europe it is expressed in millimeters.

CANNELURE A groove around the circumference of a bullet or case such as the lubrication groove of a lead bullet, the expansion groove of an open point expanding bullet or the extractor groove around the head of a rimless cartridge case.

CHAMBER The enlarged portion of the bore, at the breech, in which the cartridge rests when in position to be fired.

CHOKE The constriction in the muzzle end of a shotgun bore by means of which control is exerted upon the shot charge in order to throw its pellets into a definite area or predetermined concentration. Degree of choke is measured by the approximate percentage of pellets in a shot charge which hit within a 30 inch circle at 40 yards. The following table give the accepted percentages obtained with various chokes:

| | |
|-------------------------|--------|
| Full Choke | 65-75% |
| Improved Modified | 55-65% |
| Modified | 45-55% |
| Improved Cylinder | 35-45% |
| Cylinder Bore | 25-35% |

CHRONOGRAPH The instrument used to determine the velocity of a projectile in flight.

CONE The slope of the forward end of the chamber of a shotgun which decreases the chamber diameter to bore diameter. Also called forcing cone.

CRIMP In shotgun shells the fold-over of the end of the shell to hold the shot in position within the shell. In rifle or handgun cartridges, the slight bending in of the mouth of the case so it enters the cannulure on the bullet, thus securing the bullet in the case.

CUP Copper Unit of Pressure. A pressure value determined by means of copper crusher cylinders using SAAMI recommended procedures and equipment.

DRAM EQUIVALENT A dram is a measure used for black powder and is normally used as a volume measure (although strictly speaking it is a weight measure equivalent to 1/16 oz. or 1/256 lb.). A certain dram charge of black powder imparts a certain velocity to a given weight of shot. For example, three drams of black powder with 1 1/8 oz. shot in 12 gauge gives about 1200 ft./sec. muzzle velocity. When the change to smokeless powder was made, the dram equivalent designation was used as a measure of the approximate velocity and shot weight of commercial loads to the dram equivalent system, but modern loadings depart from the system in a number of instances.

Some shooters mistakenly believe a low dram equivalent is synonymous with low pressure. This is not so, as all modern shotshells regardless of dram equivalent marking, gauge, brand, powder or shot charge are loaded to approximately the same pressure level. Therefore, those who attach significance to the term "dram equivalent" in respect to chamber pressure are in error.

The main problem is that people still confuse a "dram equivalent" designation with a "dram measure" of powder and this may be serious in the case of modern fast burning shotshell powders. Taking the density of black and smokeless powders into account, a volumetric 3-dram measure of such modern fast powders is approximately 40 grains (where a grain equals 1/7000 lb.) or about a double charge.

Dram Equivalent - WARNING Never use the dram equivalent measure as a weight for smokeless powders in reloading. Dangerously high pressures can occur and result in personal injury, property damage, or death.

ENERGY The measure of the work performed by a bullet, expressed in foot pounds. Energy depends upon the weight of the bullet and the square of the velocity, hence it is less at long range than at the muzzle because the velocity has fallen off at long range. Energy is easily calculated. Simply multiply the velocity by itself, then by the weight of the bullet, and divide 450240 into the result. Thus 2390 x 2390 x 150 divided by 450240 = 1903 ft. lbs., the muzzle energy of the 30-30 Winchester 150 grain cartridge.

GAUGE, SHOTGUN The unit of measure of the bore diameter of a shotgun. The gauge is the number of lead balls, of the diameter of the gun bore, that make a pound. Thus, a 12-gauge, or 12 bore means that 12 pure lead balls of such a diameter will weigh one pound. The standard diameters of shotgun bores of various gauges are as follows:

| | |
|---------------------------|-----------|
| 4 gauge | .935 inch |
| 8 gauge | .835 inch |
| 10 gauge | .775 inch |
| 12 gauge | .730 inch |
| 16 gauge | .670 inch |
| 20 gauge | .615 inch |
| 28 gauge | .550 inch |
| 410 bore (36 gauge) | .410 inch |

GRAIN 1. A unit of weight (avoirdupois), 7000 grains per pound. **2.** The grain unit is commonly used in American and English ammunition practice to measure the weight of components. **3.** A term applied to a single particle of propellant powder.

LUBALOY A trade-mark for Winchester copper-coated shot and bullets.

LUBRICATION OF BULLETS Most lead bullets have to be lubricated with a grease or wax placed on their surface or in their grooves to prevent their leading the bore. Outside-lubricated cartridges have the lubricant placed on the surface of the bullet outside the case. Inside-lubricated bullets have the lubricant placed in grooves or cannulures on the bullet where it is covered by the neck of the case.

LUP Lead Unit of Pressure. A pressure value determined by means of lead crusher cylinders. Now generally obsolete- replaced by Piezo electric measurements of actual pressure.

MUZZLE The end of the gun barrel from which the bullet or shot emerges.

PATTERN The distribution of a charge of shot fired from a shotgun. See Choke.

PRESSURE In a gun, the force developed by the expanding gases generated by the combustion of the propellant. When gases expand in a confined space they exert pressure. When smokeless powder burns it forms gases which occupy many times the volume of the solid propellant. The heat of burning expands these gases even more.

When a cartridge is fired in a rifle or shotgun the gas pressure is exerted equally in all direction. The area where this pressure not easily results in the expansion of the gas volume is on the base of the bullet or wad column. The bullet or shot is free to move and the expanding gases rapidly push it down the barrel and out the muzzle.

If pressure is too low, non-uniform ignition will result, and with it non-uniform velocities and poor accuracy. In extreme cases, there will not be enough gas pressure to push the bullet or shot out the barrel. An obstruction will be left that will result in damage to the barrel on the next shot.

If pressure is too high, gas pressure builds up to a point that damage to the firearm and/or personal injury can result.

Follow the loading data given and avoid trouble.

Pressures are designated by "CUP", "LUP" and "psi" meaning "Copper Units of Pressure", "Lead Units of Pressure" and "pounds per square inch".

PROJECTILE A ball, shot, or bullet fired from a firearm.

PUMP GUN Common name for a slide action repeating firearm.

RANGE The distance measured from the firing point of the firearm to the target. Also a place where rifle and pistol shooting is conducted.

RIFLING The spiral groove cut in the bore of a rifle or pistol barrel. The object of these grooves is to rotate the elongated projectile so that it will fly point-on to the target. A rotating projectile has a gyroscopic stability which causes it to resist any force tending to deflect it from the direction it takes as it departs from the muzzle of the rifle. The longer the bullet and the lower the velocity, the quicker the twist must be to cause the bullet to travel with point to the front.

SEMI-AUTOMATIC A type of firearm which, by pulling the trigger, utilizes the energy of recoil, or the powder gases, together with a heavy counter-balanced bolt and strong bolt spring, to eject the fire case, load a fresh cartridge from magazine into chamber, and close the breech ready to fire another round. The trigger must be pulled for each shot.

SHOT Spherical pellets used in loading shotshells. Commonly formed from lead or steel. (See Steel Shot warning page 11.)

THROAT The forward portion of the rifle chamber where it tapers to meet the bore diameter.

TRAJECTORY The course described by a projectile in flight. It forms an arc due to the effect of gravity on the bullet. Usually measured in terms of height above the line of sight at midrange.

VELOCITY The speed of the bullet or shot charge, measured in feet per second (fps) at or near the muzzle.

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