



# Sidelock Rifle Warranty Information

This book contains information critical to the safe use and maintenance of Connecticut Valley Arms muzzleloading firearms. **YOU MUST READ THIS MATERIAL ENTIRELY AND FULLY UNDERSTAND THIS INFORMATION BEFORE YOU CAN SAFELY USE YOUR MUZZLELOADER.** If firearm is loaned or sold by a dealer or individual this book must accompany the firearm. Replacement books are available from our factory. Call CVA Customer Service at (770) 449-4687 if you have any questions.

CVA • SUPERB ACCURACY • LIMITED LIFETIME WARRANTY



# Sidelock Rifles

Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

Caliber \_\_\_\_\_ Date Purchased \_\_\_\_\_

Type of Gun \_\_\_\_\_

## Warranty Information

### WARNING

**IF HANDLED IMPROPERLY FIREARMS ARE DANGEROUS. READ AND FOLLOW ALL "CAUTIONS", "CAUTION" AND WARNINGS OF "DANGER" TO AVOID SERIOUS INJURY AND/OR DEATH AND/OR PROPERTY DAMAGE.**

Call CVA Customer Service at 770-449-4687 if you have any questions or visit on the Internet at: [www.cva.com](http://www.cva.com) or E-mail us at: [info@cva.com](mailto:info@cva.com)

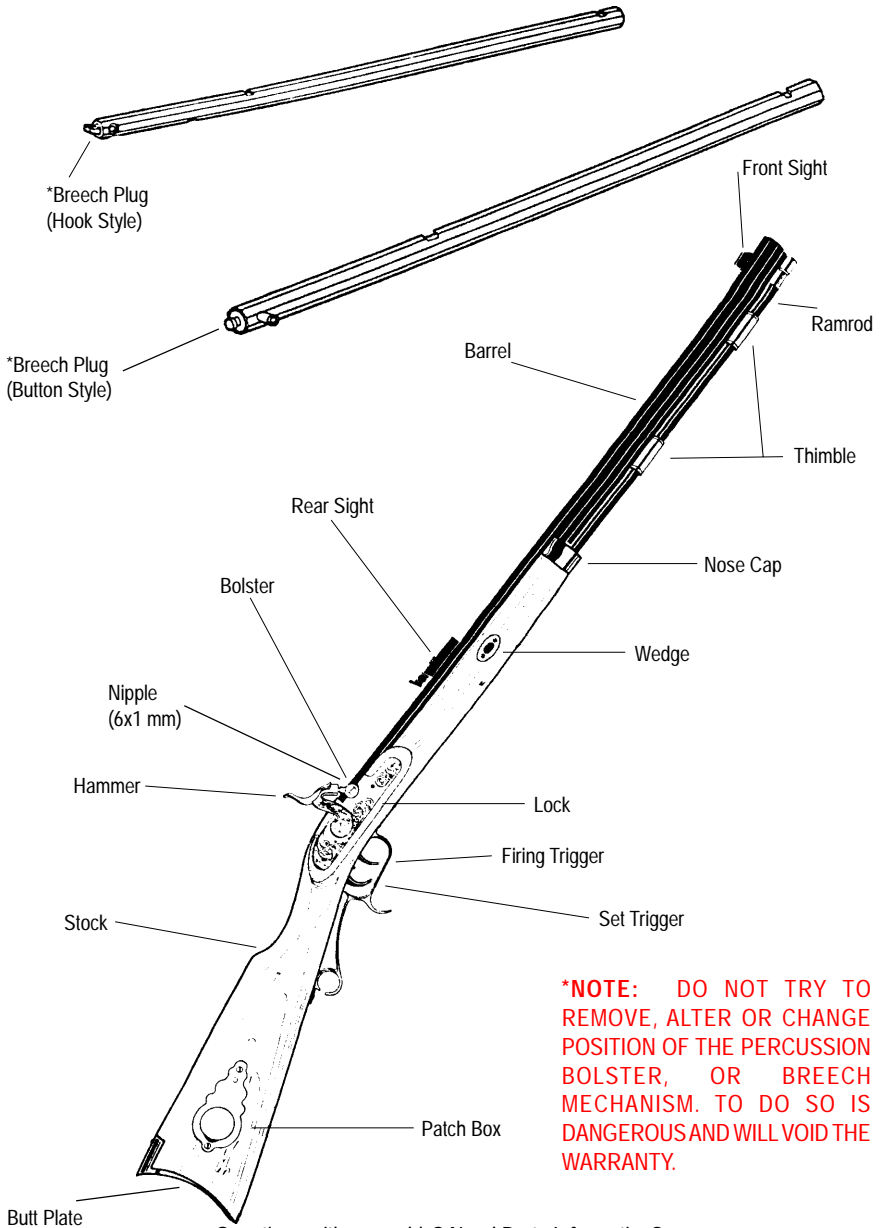


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## Main Components of a Sidelock Muzzleloading Rifle



**\*NOTE:** DO NOT TRY TO REMOVE, ALTER OR CHANGE POSITION OF THE PERCUSSION BOLSTER, OR BREECH MECHANISM. TO DO SO IS DANGEROUS AND WILL VOID THE WARRANTY.

Questions with assembly? Need Parts Information?

CALL: 770-449-4687

Monday - Friday. 8:30 - 4:00 Eastern Time

[www.cva.com](http://www.cva.com) or E-mail at: [info@cva.com](mailto:info@cva.com)



**WARNING:** It is important to take the time to read and understand the information found in this book. Familiarize yourself with each part of the firearm and its proper function. The information contained in the book is critical for the proper use and care of your firearm. **DO NOT ATTEMPT TO LOAD OR FIRE YOUR MUZZLELOADER UNTIL YOU HAVE READ AND UNDERSTAND THE INFORMATION DESCRIBED IN THIS BOOK.**

Replicas of original muzzleloading firearms are as faithful to the original designs as possible. For this reason, replicas cannot be made with many of the refinements and features that are standard on modern cartridge firearms.

Each shooter should remember that now, just as in colonial days, there is no way to build a muzzleloader that absolves the user from the need to use good judgement and safety precautions.

When handled properly, a muzzleloader is a safe and enjoyable firearm for shooting and hunting. If abused, harmful consequences can result. Treat this muzzleloading firearm with the full respect due any firearm.

**NOTE:** If, after reading the instructions, cautions and dangers contained in this manual, you are not willing to accept the responsibilities involved in shooting a muzzleloader, return the gun (or kit) to your dealer before firing or building. If you have questions concerning safe use of your CVA firearm, write or call our customer service department at 5988 Peachtree Corners East, Norcross, Georgia 30071; 770-449-4687; info@cva.com

**CAUTION:** If you sell, trade or give this gun (or kit) to another person, make sure you give the new owner a copy of this manual or advise him to get a copy from CVA.

## A. INTRODUCTION TO SIDE-LOCK MUZZLELOADERS

Sidelock design muzzleloaders are so described due to the fact that the ignition source (flint, #11 percussion cap, or musket percussion cap) is located to the side of the propellant charge. By contrast, the ignition source of the more modern In-line design muzzleloaders is positioned directly behind (or, in line with) the propellant charge.

Among sidelock design muzzleloaders, there are two distinct categories of rifles in production today. These categories are differentiated by their ignition systems. The more primitive design, utilizing a piece of stone (flint) striking metal (frizzen) to generate the spark which begins the overall ignition of the propellant charge, is called Flintlock. The more modern design (mid-1800s) employs a percussion cap ignition system and is called Caplock.

## B. GETTING STARTED

1. Safety First - Verify gun is unloaded
2. Assemble gun



3. Check all functions
4. Remove nipple  
Clean and check opening  
Apply grease to threads
5. Clean barrel
6. Replace and tighten nipple until snug
7. Read and study information booklet
8. Understand terminology
9. Get all questions answered

## **C. TEN COMMANDMENTS OF FIREARM SAFETY**

1. Keep the gun muzzle pointed in a safe direction
2. Be sure of your target and beyond
3. Never rely on a gun's "safety"
4. Gun should be unloaded until ready to use
5. Always wear eye and ear protection
6. The barrel should be clear of obstruction before shooting
7. Handle every gun as if it is loaded
8. Keep guns and ammo separate and in locked storage
9. Avoid alcoholic beverages and drugs before and during using a firearm
10. Do not alter or modify your firearm. Have your firearm checked regularly by a competent gunsmith. Make sure all parts work properly.

## **D. SAFETY CONSIDERATIONS UNIQUE TO MUZZLELOADERS**

1. Never smoke when shooting or handling a muzzleloader or related equipment. Ashes and/or loose sparks may cause powder or caps to ignite, resulting in personal injury or death.
2. Always wear eye protection. Flying debris from the breech area is always a possibility with any muzzleloader.
3. Never pour powder into a muzzleloader directly from a flask, horn or any large volume, enclosed container. Hot embers in the barrel could cause the container to explode.
4. All powder storage containers and percussion caps should be kept well away from the area where shooting is to be conducted. Sparks from shooting could cause accidental ignition of these devices. Follow all manufacturers instructions for long term storage of powder and percussion caps.
5. Use only blackpowder, Pyrodex, Pyrodex Pellets (in approved rifles only), or other approved blackpowder substitutes in muzzleloading firearms. **Never use modern smokeless powder in a muzzleloader. The use of any amount of smokeless powder in a muzzleloader will create dan-**



**gerously high pressures upon ignition and may result in severe injury or death to the shooter and/or bystanders.**

6. Always check to ensure that your muzzleloader is in good working condition before use. Test the hammer and lock mechanisms carefully prior to loading. Check the barrel for any obstruction as any blockage may cause the gun to explode.
7. **Use only recommended loading data for the particular model of rifle in use. Different models have different powder charge and projectile capabilities. Improper loading or overloading of a muzzleloading firearm may result in severe injury or death.**
8. Never place a cap on the firearm until you are ready to fire. Cap should always be removed when walking, climbing trees or fences, transferring the gun from one person to another, leaving the gun unattended, etc.
9. Never lean or rest a loaded muzzleloader against a tree, wall, vehicle or other surface. Any fall of the loaded gun may cause accidental discharge resulting in severe injury or death to bystanders.
10. Never transport a loaded muzzleloader in any type of vehicle. A muzzleloader is considered loaded until powder, bullet and percussion cap are removed.
11. Never exchange a loaded muzzleloader with any other person. Only the party who personally loaded or witnessed the loading of the muzzleloader should fire it. This practice will help prevent overloading or doubleloading, which may cause severe injury or death.
12. Never store a loaded muzzleloader. Muzzleloaders should be unloaded and cleaned prior to any storage.
13. Never load a muzzleloader without first making sure that it is unloaded.
14. Exercise extreme caution when hunting from treestands with muzzleloaders. The dropping of a loaded muzzleloader may cause accidental discharge leading to severe injury or death. Be sure the cap is removed whenever raising or lowering the firearm.
15. Never allow the hammer of a muzzleloader to rest against the cap. Any impact to the hammer or bolt could cause accidental discharge.
16. Never rely upon the "half cock" position as a safety. Muzzleloaders should always be handled as if ready to fire, regardless of the safety systems employed.
17. Always use proper cleaning procedures. Firing improperly maintained muzzleloaders may lead to unsafe pressure conditions, resulting in severe injury or death.
18. Make sure that the projectile is firmly seated against the powder charge. "Short starting" of the projectile may cause the gun to explode.
19. Always keep the muzzle of the gun pointed in a safe direction while loading. Never lean over the muzzle while loading.



## E. SPECIFIC CAUTIONS FOR SAFE USE OF CVA SIDELOCK MUZZLELOADING FIREARMS

**YOU ARE RESPONSIBLE FOR FIREARM SAFETY!** As a gun owner, you accept a set of demanding responsibilities. How seriously you take these responsibilities can mean the difference between life and death. There is no excuse for careless or abusive handling of any firearm. At all times handle your muzzleloader with intense respect for its firepower and potential danger.

Please read and understand all of the cautions, proper handling procedures, and instructions described in this book before using your new CVA firearm.

Seek professional instruction to become familiar with muzzleloading firearms. Qualified organizations such as local gun clubs, the National Rifle Association, the National Muzzleloading Rifle Association, and state hunter education programs offer approved courses which teach safe handling and hunting procedures. Muzzleloading firearms are different in function and safety features from modern firearms. Because of these differences, exercise caution and skill in the use of muzzleloading guns. Read and understand the functions and terminology explained in this book before attempting to use your CVA muzzleloader.

1. When selecting powder loads be sure to use the correct loading data for your particular model. CVA sidelocks are not designed to fire "magnum" loads.
2. Pyrodex Pellets should not be used in any CVA sidelock unless equipped with a Musket Cap Nipple. Pyrodex Pellet charges should never exceed 100 total grains in .50 caliber rifles and 120 total grains in .54 caliber rifles. **Colorado MusketMag™ series CVA sidelocks are designed specifically for use with Pyrodex Pellet/Saboted bullet loads.**
3. Always follow recommended loading data when selecting bullet type and weight. When using sabot bullets (1 in 32" twist barrels only) and Pyrodex Pellets, maximum bullet weight should not exceed 300 grains. With loose powder loads, conical lead bullets should never exceed 400 grains.
4. Never use oversized conical bullets in any CVA gun.
5. Always use Musket Caps and the CVA MusketMag™ Musket Cap Nipple (AC1425) when firing Pyrodex Pellet loads. The extra fire to the charge ensures efficient burn of the entire pellet charge.
6. Always use sabot bullets when using Pyrodex Pellets. Sabots provide the tight gas seal necessary for efficient burn of the entire pellet charge.
7. When using Pyrodex Pellets and sabot bullets, actual bullet weight should never exceed 300 grains. Heavier bullets may produce dangerously high pressure levels, possibly resulting in explosion of the gun and severe injury to the shooter and bystanders.
8. **Never shoot patched round balls or conical bullets with Pyrodex Pellets.**
9. Never use modern smokeless powder, or any mix of smokeless powder, in CVA rifles. Such improper loading of the rifle may result in the explosion of the gun, causing severe injury or death to the shooter and bystanders.
10. Never use "Poly Patch" in any CVA rifle.





## VOLUNTARY RECALL

In August 1997, CVA implemented a Voluntary Recall of In-Line rifle models with serial numbers ending in 95 or 96. If you have, or know of someone who has, a CVA In-Line model with these serial numbers do not use the gun. If your gun is affected, call CVA's TECH-LINE at 770-449-4687 for complete details, including a free replacement barrel.

## F. COMMON MISCONCEPTIONS REGARDING MUZZLELOADERS

1. **MISCONCEPTION:** *A MUZZLELOADER IS UNLOADED AFTER THE CAP IS REMOVED.*
  - As long as the barrel is loaded with powder and projectile the firearm is loaded and must be treated as a loaded firearm.
2. **MISCONCEPTION:** *A MISFIRE WILL NOT FIRE AFTER A MINUTE OR TWO.*
  - Misfire is the least understood condition and the leading cause of accidents - mainly because the condition is treated casually. When a misfire occurs keep the muzzle pointed in a safe direction until the load has been cleared from the barrel. Potentially dangerous misfires occur when the cap or priming powder ignites, but the main powder charge fails to ignite. Possibilities are (1) a blocked or clogged vent (flash channel or touchhole), (2) a contaminated (wet or oily) main powder charge or (3) no main powder charge. Wait a few minutes, then recap or reprime and try again to shoot out the load. When several attempts fail, remove the projectile by using an approved method described in number 3.
3. **MISCONCEPTION:** *PULLING A PROJECTILE IS A SAFE PRACTICE.*
  - Pulling a projectile is dangerous when there is a powder charge behind the projectile. Three approved methods to remove a projectile from the barrel are to: (1) Use a CO<sub>2</sub> discharger to blow the projectile from the barrel; (2) work a little powder with a vent pick through the flintlock touchhole, or remove the percussion nipple from the drum or bolster and work powder into the flash channel. Replace the nipple, recap or reprime to discharge; or (3) Remove the nipple and place the barrel's breech in eight inches of water to soak (deactivate) the main powder charge for about an hour before pulling the projectile.
4. **MISCONCEPTION:** *BLOW DOWN THE BARREL TO CLEAN OR CLEAR THE VENT AND EXTINGUISH HOT SPARKS OR EMBERS.*
  - Blowing down the barrel is hazardous. Keep all parts of the body away from the muzzle at all times. Point the muzzle only at the intended target.

## G. BASIC ACCESSORIES FOR A MUZZLELOADER

### 1. LOADING ACCESSORIES

Propellant - Blackpowder or acceptable substitute such as Pyrodex or Pyrodex Pellets (in approved guns only). **NEVER USE SMOKELESS POWDER.**



Projectile - Balls, bullets, sabots.

Ignition Source - Percussion Cap or Musket Cap.

Flask - To transport and dispense powder.

Powder Measure - To measure correct powder charge.

Bullet Starter - To "start" bullet down the barrel.

Capper - To carry and dispense percussion caps.

## 2. CLEANING ACCESSORIES

Solvent - Cleaning solution.

Patches - For cleaning inside of barrel.

Nipple Wrench - For installing and removing nipple.

Jag - Retains cleaning patch on end of ramrod.

## 3. OTHER NEEDED ACCESSORIES

Bullet Puller - For removing lodged bullet.

Patch Puller - For removing lodged patches.

Preloaders - To hold premeasured powder charge and bullet for quick reloading.

Nipple Pick - For cleaning nipple channel of fouling and/or debris.

# H. BLACKPOWDER AND PYRODEX

**WARNING:** Many manufacturers, including CVA, are now promoting guns which are designed to shoot heavier than standard powder charges. Some shooters have become confused by advertising for these rifles and attempt to use heavier charges and/or projectiles in guns which were not designed to handle the resulting high pressures. Even some experienced shooters have made this mistake. Some have even used what is known as a "duplex load," which is a mixture of blackpowder and smokeless powder. Any percentage of smokeless powder in a duplex load may create pressures equal to a pure smokeless charge and could cause a blackpowder gun to explode. **THESE LOADING PRACTICES ARE EXTREMELY DANGEROUS!** All shooters need to be completely clear as to the recommended loads of each blackpowder gun that they own.

Only three types of propellant are acceptable for use in CVA muzzleloading firearms.

The first type is BLACKPOWDER. (IMPORTANT: The term "blackpowder" refers to the formulation of the propellant, not the color. Many of the smokeless propellants manufactured for modern cartridges or shotgun shells are also black in color, but will create extremely dangerous pressures in the muzzleloading barrels.)

When purchasing blackpowder be certain that it is in the original manufacturer's container and that the granulation or type is clearly marked on the label.

Blackpowder is manufactured in four specific types or granulations. The accompanying chart will help identify the types and common usage:



## BLACKPOWDER CHART SHOWING APPROXIMATE USE OF THE VARIOUS GRANULATIONS...

<b>FG</b>	(Commonly called Single "F") The muzzleloading enthusiast finds little use for this very coarse blackpowder. Its use is pretty much restricted to the large bore (10, 8, 4 gauge) shotguns of yesterday.
<b>FFG</b>	(Commonly called Double "F") This is a very popular powder for the larger (.45 to .58 caliber rifles). It is also used for 12, 16 and 20 gauge muzzleloading shotguns. While it is not considered a pistol powder, it is sometimes used in very large caliber single shot pistols.
<b>FFFG</b>	(Commonly called Triple "F") It is used in all percussion revolvers, most single shot pistols, and most of the smaller (under .45 caliber) rifles.
<b>FFFFG</b>	(Commonly called Four "F") The finest of all currently available blackpowders, Four "F" is best for priming flintlocks. Due to its limited use, it is sometimes difficult to obtain.

The second type of propellant acceptable for use in CVA muzzleloading firearms is PYRODEX. Pyrodex is a propellant designed for use in percussion rifles, pistols and shotguns found to be in good shooting condition by a competent gunsmith. Pyrodex relates closely to blackpowder on a volume to volume basis, not the weight of the charge. In other words, a scoop type measure set to dispense 100 grains of blackpowder will dispense roughly 72 grains of Pyrodex (Pyrodex is bulkier). This lighter charge weight of Pyrodex will fill the measure and provide a charge which is ballistically similar to 100 grains of blackpowder of the appropriate granulation. Used in this manner, Pyrodex will yield approximately the same velocities and pressures as blackpowder. Pyrodex is currently available in three granulations. These types and their uses are listed below:

<b>PYRODEX RS (rifle &amp; shotgun)</b>	Designed for use in all calibers of percussion muzzleloading rifles and shotguns. Pyrodex Select has similar loading characteristics to RS.
<b>PYRODEX P (pistol powder)</b>	Designed for use in percussion muzzleloading pistols and cap & ball revolvers. Also used in small caliber rifles.
<b>PYRODEX CTG (cartridge powder)</b>	Designed for use in blackpowder cartridges. This powder is not suited for use in muzzleloading firearms.

The third type of propellant acceptable for CVA rifles is PYRODEX PEL-LETS. Pyrodex Pellets are designed and intended for use only in newly manufactured sidelocks equipped with a Musket Cap ignition and a rate of barrel twist of 1 in 32" or faster (Colorado MusketMag™).



Pyrodex Pellets for .50 caliber come in two grain equivalents (as of this printing 2/99) – 50 grains and 30 grains for .50 caliber; 60 grains for .54 caliber. Pellets may be combined into multiple pellet loads to create several different grain equivalent loads.

Pyrodex Pellets contain a black ignitor on one end. For best ignition, this ignitor end of the pellet should be placed into the barrel first.

When using Pyrodex Pellets in CVA rifles, the MusketMag™ Musket Cap ignition system is recommended and a sabot bullet is required. This system provides the hotter flash necessary to ensure efficient ignition of the entire pellet charge.

## I. RECOMMENDED LOADING DATA - TABLE 1

The proper charge for any muzzleloading firearm is an efficient load which provides consistent ignition and velocity while keeping breech pressures below the maximum safe levels.

The shooter should load using the minimum and maximum charge limitations shown in the table below. It is recommended to begin shooting using the minimum charge, gradually increasing the load to obtain the desired results. Tests have shown that heavier loads increase breech pressures while providing only a minor increase in velocity. These tests also indicate that heavier loads are less accurate.

TABLE 1

CALIBER FIREARM	PROJECTILE DUAMETER-TYPE	PATCH THICKNESS/INCHES	CHARGES IN GRAINS	
			MINIMUM	MAXIMUM
.32 RIFLE	.310 ROUND BALL	.015	10 FFFG	30 FFFG
.36 RIFLE	.350 ROUND BALL	.015	40 FFFG	60 FFFG
.45 RIFLE	.440 ROUND BALL	.015	50 FFG	80 FFG
.50 RIFLE	.490 ROUND BALL	.015	50 FFG	100 FFG
.54 RIFLE	.530 ROUND BALL	.015	60 FFG	120 FFG
.58 RIFLE	.562 ROUND BALL	.020	60 FFG	120 FFG
.58 MUSKET	.570 ROUND BALL	.020	60 FFG	120 FFG
.50 RIFLE	.500 CONICAL	NONE	50 FFG	100 FFG
.54 RIFLE	.540 CONICAL	NONE	60 FFG	120 FFG
.50 RIFLE	.50 SABOT	NONE	50 FFG	100 FFG
.54 RIFLE	.54 SABOT	NONE	60 FFG	120 FFG
.31 PISTOL	.310 ROUND BALL	NONE	5 FFFG	10 FFFG
.45 PISTOL	.440 ROUND BALL	.015	20 FFFG	40 FFFG
.50 PISTOL	.490 ROUND BALL	.015	20 FFFG	60 FFFG

## J. PROJECTILES

The CVA catalog and warranty book list a variety of conical bullets and sabot bullets that are proper for use in our firearms. All CVA bore diameters and bullet diameters have been carefully designed to provide a safe optimum result when used with our recommended powder charges and projectiles in the appropriate caliber.

**DO NOT USE OVERSIZED CONICAL BULLETS IN YOUR CVA GUN. CVA**



rifles are designed for use with bullets or sabots (not to be confused with Poly-Patch) and most conical bullets. Some extremely large conical bullets cause very high pressures due to poor fit to bore diameter, improper gas seal and excessive mass. The use of any conical bullet over 400 grains or sabot bullet over 300 grains in a .50 caliber rifle could cause barrel damage resulting in a non-warranty repair situation.

**FOR BEST RESULTS WITH CONICAL BULLETS ALWAYS USE CVA BUCKSLAYER™ BULLETS.** CVA Buckslayer™ Bullets have been designed for proper fit to CVA barrels, creating a superb gas seal for consistent accuracy with any CVA rifle. Buckslayer™ Bullets are easy to load, because of the knurled sides and pure soft lead construction. The dimensions and weight of Buckslayer™ Bullets have been designed to deliver maximum down-range energy, low recoil and the best possible accuracy. **DEMAND BUCKSLAYER™ BULLETS!**

**NOTE: MUZZLELOADING PROJECTILES MUST BE MADE FROM PURE LEAD. LINOTYPE OR WHEEL WEIGHT LEADS CONTAIN ANTIMONY WHICH CREATES AN EXTREMELY HARD, OVER-SIZED PROJECTILE AND IS VERY DIFFICULT TO LOAD.**

CVA has no control over projectile bullet molds used by other manufacturers. Our testing indicates most commercially available products by acknowledged manufacturers are safe to use in CVA firearms. If you have any questions concerning the correctness of a component, write or call the CVA customer service department at 5988 Peachtree Corners East, Norcross, Georgia 30071; 770-449-4687

1. **ROUNDBALLS**—with patch are the traditional projectile of the muzzleloader and provide superior accuracy and consistency in all CVA firearms. Round balls are best suited for firearms which have a slower twist rifling, but will have acceptable accuracy in the faster twist models also. (Figure 9-1D)

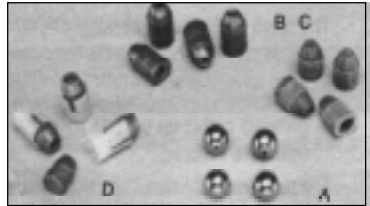


Figure 1

2. **CONICAL BULLETS**—such as the CVA Buckslayer™ Bullet, Buffalo Bullet, Maxi-Ball and others of this type provide superior accuracy in all CVA firearms as well as increased knock down power desired by hunters. These projectiles are best suited for use in fast twist rifling barrels which stabilize the bullet more rapidly. They will also yield excellent accuracy in the slower twist models. (Figure 9-1-A & B)
3. **SABOTED BULLETS**—DO NOT confuse the term "sabot" with "poly patch". Poly Patch is designed for use with round balls only and should be considered highly dangerous to use. Modern sabots from various manufacturers have been tested and provide acceptable accuracy in CVA firearms when complying with the sabot manufacturer's recommendations for usage. Best results occur when using "fast twist" barrels - 1 in 32". When shooting sabots, one patch cleaning between shots is necessary to maintain accuracy. (Figure 9-1C)

**Loads for conical bullets and sabots should not exceed the maximum load recommended in Table 1.**



**CAUTION:** Do not use any type of plastic patch or sabot with a **ROUND BALL** with any CVA firearm. When these patches are used, it is possible even under optimum tolerances for the round ball to disengage from the patch or sabot resulting in the ball moving forward in the barrel leaving a gap between the ball and the patch. Under this condition the ball will act as an obstruction in the barrel, possibly causing injury or death to the shooter or bystanders.

Various manufacturers have introduced plastic sabots which are used with pistol bullets in muzzleloaders. CVA and others have tested these sabots. Satisfactory results have been obtained when following the instructions provided by the manufacturer of the sabots. It is important to note that only those bullets recommended by the manufacturer of the sabot should be used. Sabots **MUST** not be used with round balls.

**CAUTION:** Be sure to choose the properly-sized bullet projectiles to achieve a precise fit for your particular rifle; the bullet must not slide off the powder charge. A bullet separated from the powder charge will create an obstruction which could damage the rifle and possibly cause harm to the shooter.

## K. PATCHES AND LUBRICANTS

1. The patch serves two purposes:
  - a. It is a gasket which seals the expanding gases of burning powder.
  - b. It grips barrel rifling and ball to impart a spin on the ball for stabilization and accuracy.
2. The patch material should be tightly woven but compressible enough to fill the lands and grooves of rifling, while gripping the lead ball surface.
3. Any round ball used in a muzzleloading rifle, shotgun or pistol with rifling should be patched.
4. All patches should be well lubricated prior to loading.
  - a. Lubricant should fully saturate, but not wet, fibers of patch enough to allow leakage into the powder charge.
  - b. Lubricant should keep blackpowder fouling soft for easier cleaning.
  - c. CVA All Natural Slick Load Barrel Blaster™ Solvent and Cleaner is recommended in CVA guns.
5. See Table 1, Page 8 for recommended patch thickness for your specific round ball diameter, caliber and firearm type.
6. The bullet projectiles do not require a cloth patch. They are pre-lubricated with CVA Grease Patch or CVA Slick Load™ All Natural Lube. By using your fingers, rub Grease Patch or Slick Load™ Lube into the lubricating grooves of the bullet. Be sure that all sides are well covered.





## L. LOADING AND SHOOTING CVA CAPLOCK MUZZLELOADERS

1. Put on shatterproof shooting glasses and insert ear plugs, as both percussion and flintlock guns may shower sparks or bits of caps/flints when fired.
2. **Verify the gun is unloaded.**
  - a. Place a ramrod down barrel to breech plug and mark ramrod at muzzle.
  - b. Remove ramrod and lay along outside of barrel, lining up mark at muzzle.
  - c. The other end of the ramrod should be at the bolster (or touch hole for flintlock models). This practice shows the gun is unloaded and should be disarmed before proceeding.
3. Set hammer at half-cock and check that firearm cannot be fired (that is, that the hammer cannot be moved) when the trigger is pulled. "Half-cock" refers to the notch which allows the hammer to rest above the nipple thus preventing the firearm from firing when trigger is pulled. (Figure 10-1)
4. Clean all oil and grease from bore and breech area. (See Cleaning and Maintenance.)
5. **WITH THE GUN POINTED IN A SAFE DIRECTION,** place a percussion cap on the nipple. CVA percussion muzzleloaders use a #11 sized cap.



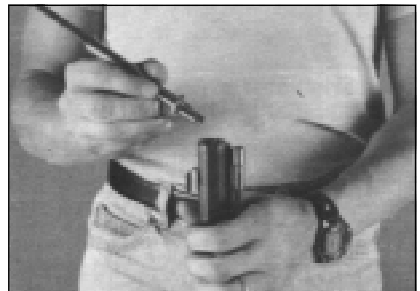
Figure 10-1

**CAUTION:** Use a capper to place cap on the nipple as percussion caps are sensitive to pressure and can explode under extreme finger pressure.

6. Fully cock the hammer and fire to dry out base of bore and nipple. Repeat this procedure three times.



Pour BLACKPOWDER into powder measure.  
Figure 11-1



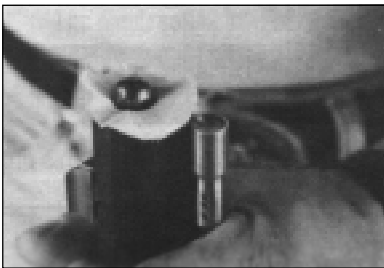
Pour measured powder charge into barrel.  
Figure 11-2

7. **With muzzle pointed "up" and with no part of your body extended over the gun,** pour a measured charge (Figure 11-1) down the barrel (Figure 11-2). (See Suitable Charges, Table 1).

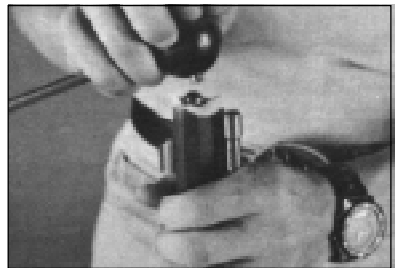


**CAUTION:** Do not pour a charge directly from horn or flask. If a smoldering ember is present, it could ignite the powder in the container, as well as the powder charge, as it is poured into the barrel. This excessive amount of powder could cause a dangerous explosion. Therefore, be safety minded; use a powder measure or other small measured charging device.

8. Tap the butt of the rifle lightly on the ground to ensure that all powder drops into the breech area of the gun.
9. Holding the rifle parallel to the ground with the lock side down, slap side of barrel in front of lock. This will help to insure that powder will fully enter the bolster and nipple area, greatly improving ignition of the powder charge.
10. For Patched Round Ball:
  - a. Center a well lubricated patch over bore. (Figure 12-1)
  - b. Press round ball with sprue (or flat portion) facing upward. (Figure 12-1)
  - c. Using the short stud of a ball starter, firmly press patched ball just into muzzle. (Figure 12-2).
11. For Lubricated Conical Bullet:
  - a. Do not use a cloth patch.
  - b. Start the lubricated bullet into the bore with your fingers making sure it is centered.
  - c. Using the short stud of a ball starter, firmly press the bullet just into the muzzle.
12. Use longer end of ball starter to move patched ball or lubricated bullet about six inches down the bore. (Figure 12-3)
13. With ramrod, push ball or bullet down on top of powder firmly, but without crushing the powder. (Figure 12-4)



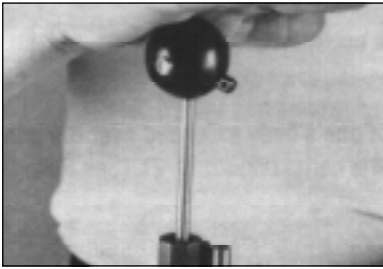
Center lubed patch and ball (with sprue "up") over bore.  
Figure 12-1



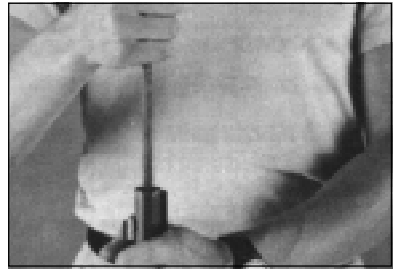
"Start" patched ball into muzzle.  
Figure 12-2

**CAUTION:** When using the ramrod, never grab it more than 8 inches above the muzzle. To do so could cause a side stress; break the ramrod; and possibly puncture your hand.





"Drive" patched ball down into barrel.  
Figure 12-3



"Ram" patched ball firmly on powder.  
Figure 12-4

**IMPORTANT:** Be sure ball or bullet is seated firmly against powder. No air space should exist between ball and powder.

**DANGER:** Firing a muzzleloader or "short starting" with the ball or bullet off the powder or part way up the barrel may cause serious damage to the firearm and possible injury to the shooter.

**HELPFUL HINT:** A good method to determine proper load depth is to insert ramrod when firearm is fully loaded and mark ramrod at the point where it protrudes from the muzzle. This mark should serve as a reference point each time you load. If the mark is above muzzle, you know ball is not against powder and charge must be removed.

14. **WITH GUN POINTED IN SAFE DIRECTION** and hammer at half-cock, place a percussion cap on nipple. **THE GUN IS NOW LOADED.**
15. Pull hammer back to full-cock position and **YOU ARE READY TO FIRE.**
16. Take aim at the target and pull trigger to fire.
17. After firing, wait one minute to reload. This allows all remaining sparks in barrel to burn out prior to reloading.
18. If a misfire or failure to fire occurs, wait at least one minute with gun pointed at the target.
  - a. Using the ramrod, reseal the ball or bullet on the powder.
  - b. Remove the nipple, place a small charge of fresh powder in bolster through nipple hole. Replace the nipple.
  - c. Install a new percussion cap on the nipple. Be certain of the target and fire.

**CAUTION:** Wait at least one minute with gun pointed at target if misfire or failure to fire occurs.

- d. Never attempt to shoot out a projectile which is not firmly seated against powder charge. The ball and powder charge should be removed using a ball puller. (See instructions in Section O on Pulling A Charge).
- e. Go back to Step 1 and repeat, being sure bore and nipple are free of obstructions and clean.

**NOTE:** DO NOT TRY TO REMOVE, ALTER OR CHANGE POSITION OF THE PERCUSSION BOLSTER OR BREECH MECHANISM. TO DO SO IS DANGEROUS AND WILL VOID THE WARRANTY.



## M. LOADING AND SHOOTING CVA FLINTLOCK MUZZLELOADERS

**NOTE:** To prepare a FLINTLOCK, sandwich the flint between a piece of leather and clamp it between the two jaws of the hammer. The angle of the beveled edge of the flint should be positioned so that when fired, it points toward the pan. With no powder in the pan or in the barrel, attempt a few dry fires to verify the position of the flint and the amount of spark. Place a small amount of powder in the pan and fire. This will dry out the pan and touch hole. Repeat this function two or three times.

1. The basic instructions for loading and shooting a percussion muzzleloader also apply to flintlocks, except that no percussion caps are required.
2. A flint should be placed between one or two pieces of leather and tightly inserted into hammer. The beveled edge should face down and parallel. (Figure 14-1)
3. Refer to section LOADING AND SHOOTING OF PERCUSSION MUZZLELOADER. Follow instructions up to and including Step 13.
4. Pick the touch hole with a nipple pick (CVA AC1582) to insure that no obstruction is blocking the hole before loading.

5. **WITH GUN POINTED IN A SAFE DIRECTION** and hammer at half-cock, prime the pan with FFFFG blackpowder. Important: Use a "primer flask" such as CVA's AC1388 or another device specifically designed for this purpose. (Figure 14-2)



Figure 14-1

6. Pull frizzen down over pan to keep powder in place. THE GUN IS NOW LOADED.
7. Fully cock gun. YOU ARE NOW READY TO FIRE.
8. When trigger is pulled, the flint will strike the frizzen to shower sparks into the pan. Both flint and frizzen must be completely dry.
9. If a misfire or failure to fire occurs, wait at least one minute with the gun pointed at the target.

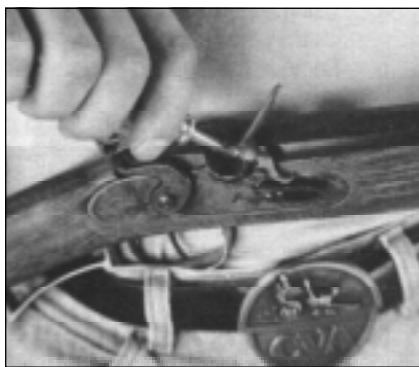


Figure 14-2

- a. Wipe all powder burnt or unburnt from the pan on the frizzen and flint. Then reset ball.
- b. Pick touch hole with a vent hole pick (small wire) to insure that the hole is unobstructed.
- c. Reprime pan allowing a gap between powder and touch hole.



- d. FIRE
- e. If the gun fails to fire, refer to Section O, Pulling a Charge.

## N. CLEANING AND MAINTENANCE

Blackpowder and Pyrodex are very corrosive. Therefore, careful cleaning of your muzzle-loading firearm is extremely important. If left uncleaned for any length of time the fouling will cause rust, pits, and degradation of the metal particularly around threaded areas.

**WARNING: UNDER NO CIRCUMSTANCES SHOULD ATTEMPTS BE MADE TO REMOVE THE BOLSTER OR BREECH PLUG. THIS IS AN INTEGRAL PATENTED SYSTEM WHICH CAN ONLY BE REMOVED OR INSTALLED BY QUALIFIED FACTORY PERSONNEL. ANY FORM OF TAMPERING WILL VOID ALL WARRANTIES.**

The barrel attaching system on most CVA firearms allows for the barrel to be removed for easier cleaning without disassembly. The recommended cleaning procedure for most CVA rifles, pistols, and shotguns follows.

**NOTE: Before beginning this procedure make sure gun is unloaded. (See Section L, Step 2).**

1. Remove the ramrod.
2. Depending on the model gun you have, tap out the wedge pin in the forearm or remove the screw in the bottom of the stock.
3. Pull the hammer to the full-cock position.
4. Lift the barrel out of the stock and remove the nipple or flash hole liner.
5. Attach a cleaning jag to the ramrod.
6. Place the breech end of the barrel into a pail of hot soapy water and push a wet patch down the muzzle with the ramrod.
7. Pump the rod and patch up and down in the barrel, drawing soapy water into the barrel through the nipple orifice. **HELPFUL HINT:** The bolster clean out screw on percussion rifles can be removed for easier cleaning. If this is done, be certain that the screw is cleaned separately before being installed.
8. Replace cleaning patches as often as needed until barrel is clean of all signs of fouling.
9. When completed, wipe off all excess water and dry barrel thoroughly.
10. Clean fouling on the stock, lock and exterior parts by wiping with an oily cloth.
11. Oil the barrel inside and out well and reassemble the firearm by reversing Steps 1-4. Lightly coat the threads of the nipple and bolster screw or flash hole liner with grease.



## O. PULLING A CHARGE

Under normal conditions a muzzleloading firearm is unloaded simply by firing it into a suitable and safe backstop. There are, however, some conditions under which the firearm cannot be fired and the charge must be pulled.

THE TWO MOST COMMON CONDITIONS ARE AS FOLLOWS:

1. If the ball or bullet is not seated firmly against the powder charge, stop immediately! Do not attempt to fire the rifle or pistol. You must pull the charge and clean the barrel.
2. If the rifle or pistol is loaded in a proper manner yet fails to fire after repeated attempts.



**NEVER ATTEMPT TO PULL A CHARGE UNTIL THE POWDER HAS BEEN RENDERED INERT (DEACTIVATED).**

Keep the muzzle downrange and remove all priming from the firearm. Carefully remove the wedge and disengage the barrel from the stock. Lay the charged barrel on the ground using extreme care to insure that its muzzle is always pointed in a safe direction. Secure a pail of water (hot if possible) and submerge the breech section of the barrel into the water. Make certain that at least 8 inches of the breech section is under water and allow the barrel to remain submerged for at least one-half hour. The barrel should be transported only after water has totally saturated the powder charge and rendered it inert. The charge should be pulled as follows:

Carry the barrel to an area where you have access to a strong vise and where you can work without distraction. To insure that the charge has not dried out and that it is completely inert, resoak the breech section in very hot water. While the breech is soaking, pour some hot water into the muzzle end (flush with muzzle). This will soften powder fouling which has accumulated in the bore and ease removal of the projectile.

After one-half hour, remove the barrel from the water. Pour the water out of the muzzle and wipe away excess water with a rag. Pad the jaws of your vise with two blocks of wood and securely clamp your barrel so that you have access to the muzzle end. Use care to insure that the barrel is not marred in the process of clamping it. Be equally certain that it is clamped securely.

Thread a Bullet Puller of the proper caliber onto your ramrod and slip the ramrod into the bore until the screw on the puller contacts the projectile. Rotate the ramrod slowly clockwise as you tap lightly on the end of



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the ramrod with a hammer. As the puller screw bites deeper and deeper into the soft lead projectile, the ramrod will become difficult to turn and it will require the use of pliers. Pad the jaws of the pliers so that you do not mar the ramrod. Once the puller screw has embedded itself firmly into the projectile, pull out the ramrod and extract the ball or bullet. In actuality, this process is somewhat tedious and it will require your patience. When working with a badly fouled bore, the puller screw may pull free from the projectile several times before you can successfully extract the projectile. If you are persistent, you will succeed!

After the projectile has been removed from the bore, clean the bore, barrel and parts as explained in the "Cleaning" section and reassemble the firearm.

If for any reason you are unable to remove the charge in the manner recommended, soak the barrel in very hot water for one-half hour. Once the powder has been rendered inert, take the barrel to a qualified gunsmith.

**DO NOT ATTEMPT TO REMOVE THE BREECH PLUG. TO DO SO WILL VOID THE WARRANTY.**

## P. SIGHT ADJUSTMENTS

Most CVA rifles are equipped with adjustable style rifle sights for windage and elevation.

1. Make sure both the front and rear sights are positioned in the center of the barrel.
2. Aim at a target and shoot. Repeat this step three times to develop a pattern.
3. If the gun shoots to the right adjust the rear sight to the left and shoot another pattern. If the gun shoots to the left move the rear sight to the right.
4. If the gun shoots low, elevate the rear sight. If the gun shoots high lower the rear sight. Shoot a new pattern for elevation.

**NOTE: WITH THE BLADE TYPE FRONT SIGHTS (WITH NO BEAD ON TOP) IT IS POSSIBLE TO FILE DOWN THE TOP OF THE SIGHT TO SHOOT HIGHER.**

The blackpowder shooter should shoot his first shots from 13 paces from the target aiming for the center of the bulls eye. Shooting from twenty-five yards the shooter consults the table to determine the impact point on the target. The shooter's point of aim should be the center of the bull's-eye using sight adjustment information above. When the gun/bullet combination is zeroed into that point, back up to 50 yards. Taking aim at the center of the bull's-eye, the 50 yard point of impact should be 2-1/2 inches above the center of the bulls eye. The group from 100 yards should be close to the bull's eye. Shoot from the 100 yard position, making sight adjustment until the group centers on the bull's eye. Finally, check the point of impact at 50 yards to find what the actual high point is in the rifle's 100 yard trajectory.

## Q. SCOPE MOUNTING

The factory iron sights on CVA rifles are removable. Scope mounts which make use of existing screw holes are available from CVA. Do not drill additional holes in the barrel as this could weaken its structure and contribute to a rupture, causing injury and/or death to yourself and others. Many of the CVA rifles have been drilled and tapped for 8-40 UNF threads



and spaced .860" on center. Scopes should be mounted according to manufacturer's instructions.

## **R. INTRODUCTION TO THE BALLISTICS TABLES**

### **HOW VELOCITY WAS MEASURED**

Two Oehler 35P Proof chronographs were employed to gather velocity data. One shot was fired to "dress the bore" before testing for bullet velocity. The bore was swabbed between test shots when blackpowder was used but not when Pyrodex was used.

### **WHY DATA VARIES**

Two identical firearms will not produce identical velocities in spite of using exactly the same load in each one. This is due to variables. Here are two:

1. No two bores are absolutely identical in diameter. The differences may be in minute degrees, but bore diameters differ, thereby altering bullet drag (bore friction) ever so slightly.
2. Rifling varies. Rate of twist, depth of groove, smoothness or roughness of lands, and other incidentals all affect velocity.

### **POWDERS DIFFER**

Blackpowder of today is not the same as blackpowder of yesterday. There are even small differences in burning characteristics from lot to lot.

### **POWDERS MAY CHANGE IN COMPOSITION**

Today's Pyrodex, for example, is the best ever. It is "powerful." That is, it yields good energy per mass. And it is dense. In the past, there was approximately a 20% weight-per-volume difference between Pyrodex and blackpowder. One hundred grains VOLUME of FFg yielded very close to 100 grains WEIGHT, while 100 grains VOLUME of Pyrodex RS yielded about 80 grains WEIGHT. Current Pyrodex is more dense. A 100 grain VOLUMETRIC setting yielded, in tests, a mode (most repeated number) of 71.5 grains RS by WEIGHT, with a slightly higher velocity potential per charge than older Pyrodex.

### **ELEVATION AND TEMPERATURE**

Both elevation and temperature may alter velocity. A very hot day may bring slightly higher velocities, as will high altitudes. These differences are of no practical concern, but they exist.

### **ROUND BALLS MAY VARY**

A test rifle may show different velocities when different round balls are used, in spite of the different round balls being almost identical in caliber. A micrometer measurement may prove that the two different round balls are not identical. Also, cast round balls may vary in diameter and even weight compared with swaged round balls.

### **CONICALS MAY VARY**

Different conical designs, in spite of being the same weight and caliber, may show slightly different velocities due to varying bore friction. A bullet with a lot of shank (more drag), for



example, may be minutely slower in velocity than a bullet with less surface contact with the bore.

**DO NOT USE OVERSIZED CONICAL BULLETS IN YOUR CVA GUN.** CVA rifles are designed for use with patched round balls, bullets with sabots (not to be confused with Poly-Patch) and most conical bullets. Some extremely large conical bullets cause very high pressures due to poor fit to bore diameter, improper gas seal and excessive mass. The use of any projectile over 400 grains in a .50 caliber rifle could cause barrel damage resulting in a non-warranty repair situation.

**WHEN USING CONICAL BULLETS, ALWAYS USE CVA BUCKSLAYER™ BULLETS.** CVA Buckslayer™ Bullets have been designed for proper fit to CVA barrels, creating a superb gas seal for consistent accuracy with any CVA rifle. Buckslayer™ Bullets are easy to load, because of the knurled sides and pure soft lead construction. The dimensions and weight of Buckslayer™ Bullets have been designed to deliver maximum down range energy, low recoil and the best possible accuracy. **DEMAND BUCKSLAYER™ BULLETS!**

## **USEFUL DATA**

In spite of small differences in test results, a shooter can place total faith in carefully tested ballistic data because for all practical purposes, printed data reproduces quite closely in a shooter's personal firearm compared with a test firearm.

## **PYRODEX**

Pyrodex loads were not listed in this booklet; however, Pyrodex may be used **VOLU-METRICALLY** to duplicate blackpowder results. For example, a 90 grain volume charge of FFg and a 90 grain volume (not weight) charge of Pyrodex RS deliver approximately the same velocity in a .50 caliber muzzleloading rifle.

## **THE POWDER CHARGE**

Powder charges of 90 grains volume FFg for .50 caliber and 100 grains volume FFg for .54 caliber muzzleloaders were selected as prudent, safe and reliable big-game loads. The shooter may wish to use less powder or check with his rifle manufacturer for maximum allowable loads that may exceed these charges.

## **LIGHTER LOADS**

The section on target/plinking loads lists a number of general light loads that work in small-bore and large-bore muzzleloaders.

## **PATCH**

For uniformity, all patches were .015 inches thick. The shooter is urged to match patch thickness to his particular bore/firearm for best fit.

## **LUBE**

For uniformity, only one lube was used for all testing: CVA Slick Load Lube.

## **IGNITION**

For uniformity, only CVA Hot Flash® No. 11 percussion caps were used for testing.



## 100 YARD VELOCITY

One hundred yard velocity was derived from ballistic coefficient figures. A spot check to verify mathematical and actual downrange bullet velocities was conducted using an Oehler 35P Proof chronograph with Skyscreens. Computed and actual downrange velocities were quite close.

## ENERGY

Energy figures were computed using the Newtonian formula, the only formula accepted by all ammo companies.

## TRAJECTORY

Trajectory figures were derived mathematically with spot checks by shooting randomly selected loads at downrange targets. Trajectory figures are close approximations. Bullet drop will vary with elevation at various shooting sites.

The shooter is urged to by-step all problems by sighting his big-game muzzleloader with big-game load for 100 yards as a good short cut to success. Sighted dead on at 100 yards, the normal big-game loads will shoot "flat" enough to allow a maximum range of about 125 yards. While practiced and gifted marksmen may shoot much farther with muzzleloaders, the 125 yard limit remains a good one for most of us under most hunting situations. It's an ethical distance to shoot at deer-sized game. Some hunters may prefer getting closer to larger-than-deer big game, such as elk.

## ACCURACY

All rifles were fired from the bench. The group shown is the smallest three-shot group for three trials (nine shots total). Obviously, accuracy will vary from shooter to shooter, as well as firearm to firearm, especially under varying shooting conditions such as wind and temperature.

**NOTE: All conicals were introduced to the bore with the base of the projectile perpendicular to the bore, not slanted. If any conical got started downbore "on the bias," that load was fired into the butts, and not at the target.**

## S. PRACTICAL USE OF BALLISTIC DATA

### THE POWDER CHARGES

All range work was accomplished with FFg blackpowder. Pyrodex RS loaded to the same volume will produce similar results. The loads included on the following tables will serve as a reference point when working up a hunting load for the shooter's particular rifle. Vary charges at five grain increments to find the load that produces the best accuracy in a given gun. Be careful not to exceed the manufacturer's maximum recommended powder charge. Consult the warranty book or call the manufacturer to verify maximum charge.

### MUZZLE VELOCITY

Measured in feet per second, this number gives the speed of the projectile (bullet or round ball) as it leaves the barrel.





## 100 YARD VELOCITY

Measured in feet per second, this number gives the speed of the projectile at 100 yards. An interesting comparison between projectiles can be noted by figuring the percentage of velocity each projectile retained at 100 yards.

Example: CVA St. Louis Hawken

<u>Projectile</u>	<u>Muzzle Velocity</u>	<u>100 Yard Velocity</u>	<u>Velocity Lost</u>	<u>% Velocity Lost</u>
300 GR Buckslayer™ Bullet	1515	1212	303	20%
177 GR Round Ball	1712	959	753	44%

It is easily noted that the Buckslayer™ Bullet loses only 20 percent of its velocity in the first 100 yards while the round ball loses more than double that percentage.

## MUZZLE ENERGY

Measured in foot pounds, is a measure of force carried by the bullet or projectile at the moment it leaves the barrel. Energy retention is a relationship between muzzle energy and energy at a given distance.

## 100 YARD ENERGY

Also measured in foot pounds. This number is important to big-game hunters. A rule many big-game hunters live by is that deer-size game requires at least 500 foot pounds of energy delivered by the bullet (or projectile) for an efficient harvest. Referring to the data on the .50 caliber St. Louis Hawken; the patched round ball has 959 foot pounds of energy at the muzzle, but only 362 foot pounds of energy at 100 yards. From this data, most hunters would properly assume that the maximum effective range of a patched round ball with 90 gr FFg blackpowder fired from a St. Louis Hawken .50 caliber rifle to be somewhat less than 100 yards, probably in the 65-75 yard range.

For elk size game, the rule is 1,000 foot pounds of energy for effective harvest. Referring to the table for the St. Louis Hawken .50 caliber rifle, using the 300 grain CVA Buckslayer™ Bullet, 90 grain FFg Blackpowder, we find 979 foot pounds of energy at 100 yards. From this table we can surmise that the maximum effective range is slightly less than 100 yards. Referring to the .54 caliber St. Louis Hawken, firing a 375 grain Buckslayer™ Bullet, with 100 grains FFg blackpowder on the following page we can see the 100 yard energy to be 1168 foot pounds, plenty for elk.

## 50 YARD AVERAGE GROUP

This number shows the center to center measurements for the best three shot group fired from a given gun with a specific powder/projectile combination. Three sequences of three shot groups were fired with each combination. The best reproducible group is listed. For example, if the three test groups yielded results of 1.5 inch, 1.7 inch and 1.8 inch, the 1.5 inch group would be recorded. However, if the three test groups yield results of 1.5 inch, 3.0 inch and 2.5 inch, the groups would be re-shot. Our testing allowed for only half-inch variation between "best group" and "average group".



When checking the data you will note that many blackpowder guns are capable of outstanding accuracy. Many of the groups registered are in the one-inch class measuring 1.0 to 1.25 with some guns even yielding groups under an inch. Outstanding! Also note: All shooting in this manual was done with open sights. Scoped rifle tests that were conducted lead to the conclusion that the average group at 50 yards shown on the following tables could be duplicated at 100 yards by mounting a scope on the test gun.

## **TRAJECTORY SIGHT-IN INFORMATION**

The blackpowder shooter should shoot his first shots from 13 paces from the target aiming for the center of the bull's-eye. Shooting from twenty-five yards the shooter consults the table to determine the impact point, on the target. In the case of the .50 caliber CVA St. Louis Hawken / 300 grain CVA Buckslayer™ bullet combination, the table shows +1 in the 25 yard column under trajectory sight in information. The shooter's point of aim should be the center of the bull's-eye using sight adjustment information in the preceding chapter. When the gun/bullet combination is zeroed into that point, back up to 50 yards, consult the 50 yard column. Taking aim at the center of the bull's-eye, the 50 yard point of impact should be 2-1/2 inches above the center of the bull's-eye. The group from 100 yards should be close to the bull's eye. Shoot from the 100 yard position, making sight adjustment until the group centers on the bull's-eye.

Finally, check the point of impact at 50 yards to find what the actual high point is in the rifle's 100-yard trajectory. Remember, these tables serve only as a point of reference. There is no substitute for actual range work. The benefits of actual sight in will include practical understanding of the rifle, the satisfaction of knowing what the rifle can do with you behind it and pure enjoyment of target shooting.

## **THE IMPORTANCE OF THE "FOULING" SHOT FOR CONICAL BULLETS**

What is the fouling shot? Why is it so important to accurate blackpowder shooting? How do I easily produce a fouling shot? These are some of the most often asked questions regarding the fouling shot. Knowing the answers can make the difference between mediocre performance and tack driving accuracy when shooting pure lead conical bullets (not sabots!).

The fouling shot is the first shot fired from a clean barrel - and the least accurate! The accuracy potential of a barrel is actually improved by the presence of some powder residue called "fouling." On subsequent shots, this residue will create a tighter seal between the barrel and the projectile, thereby improving accuracy. Therefore, whether shooting conical bullets on the range or in the field, you should never use your first shot. Instead, count on your second, third and fourth shots to be the most accurate. After the fourth shot, clean the barrel with a clean patch and light solvent and then continue your shooting. Following this procedure will assure that you are always using the most accurate shots that your rifle can deliver.

There is also an easy way to "foul" the barrel without actually firing a bullet. Just load your gun with 80 grains of powder followed only by a cleaning patch. Point the gun in a safe direction, place a percussion cap on the nipple and fire the gun. Your barrel will now be fouled and you'll be ready to make your best shot at that trophy.

Give the fouling shot a try the next time you are out on the range. You'll see tighter groups and learn to appreciate what a "fouled barrel" can do to improve your shooting!



# LOADING DATA FOR BLACKPOWDER RIFLES

**Manufacturer:** Connecticut Valley Arms

**Name of Gun:** St. Louis Hawken

**Caliber:** .50

**Rate of Twist:** 1 in 48"

**Percussion Cap:** CVA Hot Flash

**Barrel Length:** 28"

**Lube:** CVA Slick Load Lube



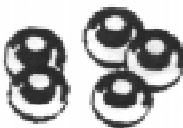
Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
300 Grain CVA Buckslayer Bullet	90 GR	1515	1529	1212	979	1.0"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1	+2.5	0	-5



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
225 Grain CVA Elite Sabot	90 GR	1726	1489	1381	953	1.5"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1.0	+2.5	0	-3



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
385 Grain Buffalo Bullet	90 GR	1379	1626	1075	990	2.0"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1.75	+3.0	0	-5.5



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
177 Grain .490 Patched Roundball	90 GR	1712	1152	959	362	1.75"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			0	+2.5	0	-5



**Manufacturer:** Connecticut Valley Arms

**Name of Gun:** St. Louis Hawken

**Caliber:** .54

**Rate of Twist:** 1 in 48"

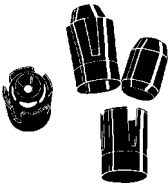
**Percussion Cap:** CVA Hot Flash

**Barrel Length:** 28"

**Lube:** CVA Slick Load Lube



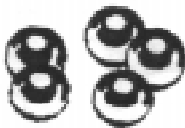
Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
375 Grain CVA Buckslayer Bullet	100 GR	1444	1737	1184	1168	1.5"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1.5	+2.5	0	-5



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
225 Grain CVA Elite Sabot	100 GR	1727	1490	1382	954	1.5"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1.0	+1.5	0	-3



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
425 Grain Buffalo Bullet	100 GR	1466	2029	1202	1364	2.0"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+2.0	+2.5	0	-5



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
225 Grain .530 Patched Roundball	100 GR	1673	1399	1004	504	2.0"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+2.0	+2.75	0	-5



**Manufacturer:** Connecticut Valley Arms

**Name of Gun:** Colorado MusketMag™

**Caliber:** .50

**Rate of Twist:** 1 in 32"

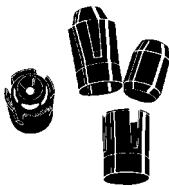
**Percussion Cap:** CVA Hot Flash

**Barrel Length:** 26"

**Lube:** CVA Slick Load Lube



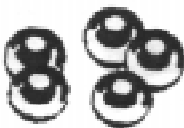
Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
300 Grain CVA Buckslayer Bullet	90 GR	1483	1465	1187	939	1.0"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1	+2.5	0	-5



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
225 Grain CVA Elite Sabot	90 GR	1613	1300	1290	832	1.5"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1	+1.5	0	-3



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
385 Grain Buffalo Bullet	90 GR	1381	1631	1077	992	1.25"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1.75	+3	0	-5.5



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
177 Grain .490 Patched Roundball	90 GR	1777	1291	995	389	2.5"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			0	+2.5	0	-5



**Manufacturer:** Connecticut Valley Arms

**Name of Gun:** Colorado MusketMag™

**Caliber:** .54

**Rate of Twist:** 1 in 32"

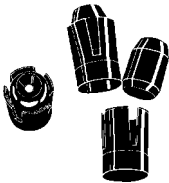
**Percussion Cap:** CVA Hot Flash

**Barrel Length:** 26"

**Lube:** CVA Slick Load Lube



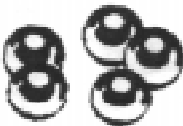
Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
375 Grain CVA Buckslayer Bullet	100 GR	1396	1623	1145	1092	.5"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1.5	+2.5	0	-5



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
225 Grain CVA Elite Sabot	100 GR	1671	1395	1367	934	1.25"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1.0	+1.5	0	-3



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
425 Grain Buffalo Bullet	100 GR	1431	1933	1173	1299	1.0"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+2.0	+2.5	0	-5



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
225 Grain .530 Patched Roundball	100 GR	1632	1331	979	479	2.75"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+2.0	+2.75	0	-5



**Manufacturer:** Connecticut Valley Arms

**Name of Gun:** Bobcat, Mountain Stalker

**Caliber:** .50

**Rate of Twist:** 1 in 48"

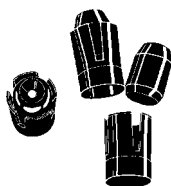
**Barrel Length:** 26"

**Percussion Cap:** CVA Hot Flash

**Lube:** CVA Slick Load Lube



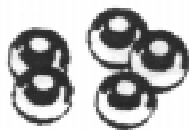
Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
300 Grain CVA Buckslayer Bullet	90 GR	1519	1537	1215	984	1.5"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1.5	+2.5	0	-5



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
225 Grain CVA Elite Sabot	90 GR	1694	1434	1355	918	1.5"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1.0	+1.5	0	-3



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
385 Grain Buffalo Bullet	90 GR	1366	1596	1065	970	1.75"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1.75	+3.0	0	-5.5



Projectile	Powder Charge FFG	Muzzle Velocity FPS	Muzzle Energy FP	100 Yard Velocity FPS	100 Yard Energy FP	50 Yard Average Group
177 Grain .490 Patched Roundball	90 GR	1749	1203	979	377	2.0"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			0	+2	0	-4.5



## T. STATEMENT OF LIABILITY

This gun is classified as a firearm or dangerous weapon and is sold by us with the express understanding that we assume no liability for its resale and unsafe handling under local laws and regulations. Connecticut Valley Arms assumes no responsibility for physical injury or property damage resulting from intentional or accidental discharge, or the function of any gun subject to influences beyond our control. We will honor no claim which was the result of careless or improper handling, unauthorized adjustment, improper loading, use of improper powder or components, corrosion or neglect.

For your protection, examine this firearm carefully at the time of purchase. If any unsafe condition exists contact your dealer or CVA immediately.

Connecticut Valley Arms does not recommend or approve of any custom alteration or conversion. Firearms subjected to alteration are not covered by factory warranty. Responsibility for these alterations rests totally with the individual performing such work. Any such work done improperly or without proper judgement may cause malfunction or damage resulting in injury or death to the shooter and/or bystanders.

## U. SERVICE – (770) 449-4687 MON-FRI 8:30 - 4:00 PM EST

Should your CVA firearm require repair, we recommend that it be returned to our factory. This will insure all work is performed by a competent staff of trained technicians.

Any firearm returned to the factory should be marked to the attention of the Customer Service Department. A letter of instructions should be enclosed to facilitate handling. **All firearms must be unloaded and shipped via United Parcel Service (UPS).**

Our Service Department will inspect and evaluate the problem. Should any work required not be covered by warranty, you will be advised of the cost. No work will be done without your approval.

## V. ORDERING INSTRUCTIONS FOR REPLACEMENT PARTS

1. All correspondence and orders must be addressed to:  
CVA  
5988 Peachtree Corners East  
Norcross, GA 30071  
Attention: Customer Service
2. Include in the order:  
Model of Gun  
Part Number  
Part Description  
Caliber and Type (Percussion, Flintlock)
3. If the proper part identification is not possible from the parts list, send the specific part in question to aid identification.
4. Discontinued items are subject to availability. CVA will reserve the right to make compatible substitutions when necessary.





5. Enclose the total retail price of the item plus postage and handling. Refer to the chart to determine this.
6. Please allow four to six weeks from receipt of order for delivery.

## POSTAGE & HANDLING CHART

Orders Totaling:	Add
UP TO \$20.00 .....	\$3.50
\$20.01 - \$30.00 .....	\$5.00
\$30.01 - \$50.00 .....	\$7.00
\$50.01 - \$80.00 .....	\$10.00
\$80.01 - \$110.00 .....	\$15.00
\$110.01 - \$200.00 .....	\$20.00
\$200.01 - \$500.00 .....	\$25.00
OVER \$500.00 .....	\$30.00

Georgia residents must add 6% sales tax.

## W. LIMITED LIFETIME WARRANTY

Connecticut Valley Arms, (CVA), warrants all factory finished firearms to be free of defects in material or workmanship, for the lifetime of the firearm, to the original consumer owner. This warranty is established by return of the authorized warranty card within fifteen (15) days of purchase, and is not-transferable.

Any CVA firearm or part thereof returned postage paid to the address below will be repaired or replaced to our commercial standard, free of charge, and returned to the purchaser postage prepaid.

This warranty does not cover any damage resulting from careless handling, improper loading, corrosion, neglect, or customer alteration. Nor does it cover normal wear of any part, metal or wood finish, cost of inconvenience due to product failure, or transportation damage.

Connecticut Valley Arms reserves the right to refuse to repair or replace firearms or parts thereof damaged by the above. This warranty does not apply to "kit" models. While CVA does guarantee quality and workmanship of the parts contained in each kit, we have no control over final finishing and assembly of these products. Therefore, no responsibility for construction or use of kit models is implied or assumed. Any part determined, by our inspection, to be faulty will be replaced free of charge.

This warranty gives you specific legal rights. You may also have other rights which vary from state to state.

This warranty is void if:

- Any propellant other than the correct type blackpowder or Pyrodex has been used
- CVA recommended powder charge has been exceeded
- Any form of plastic patch has been used (modern day sabots not included)
- Any attempt has been made to remove bolster or breech plug.

Address all inquiries and correspondence to:  
Connecticut Valley Arms  
5988 Peachtree Corners East  
Norcross, GA 30071



**Connecticut Valley Arms**

5988 Peachtree Corners East  
Norcross, Georgia 30071