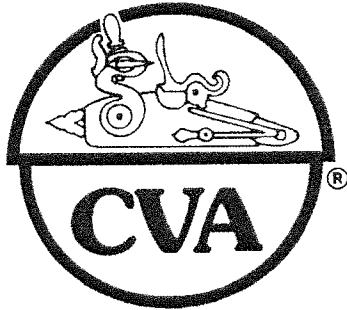


Conventional and Bolt Action In-Line Rifle Warranty Information

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.



Conventional & Bolt Action In-Line 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 us on the Internet at: www.cva.com or E-mail us at: info@cva.com



Main Components of a Conventional In-Line Muzzleloading Rifle

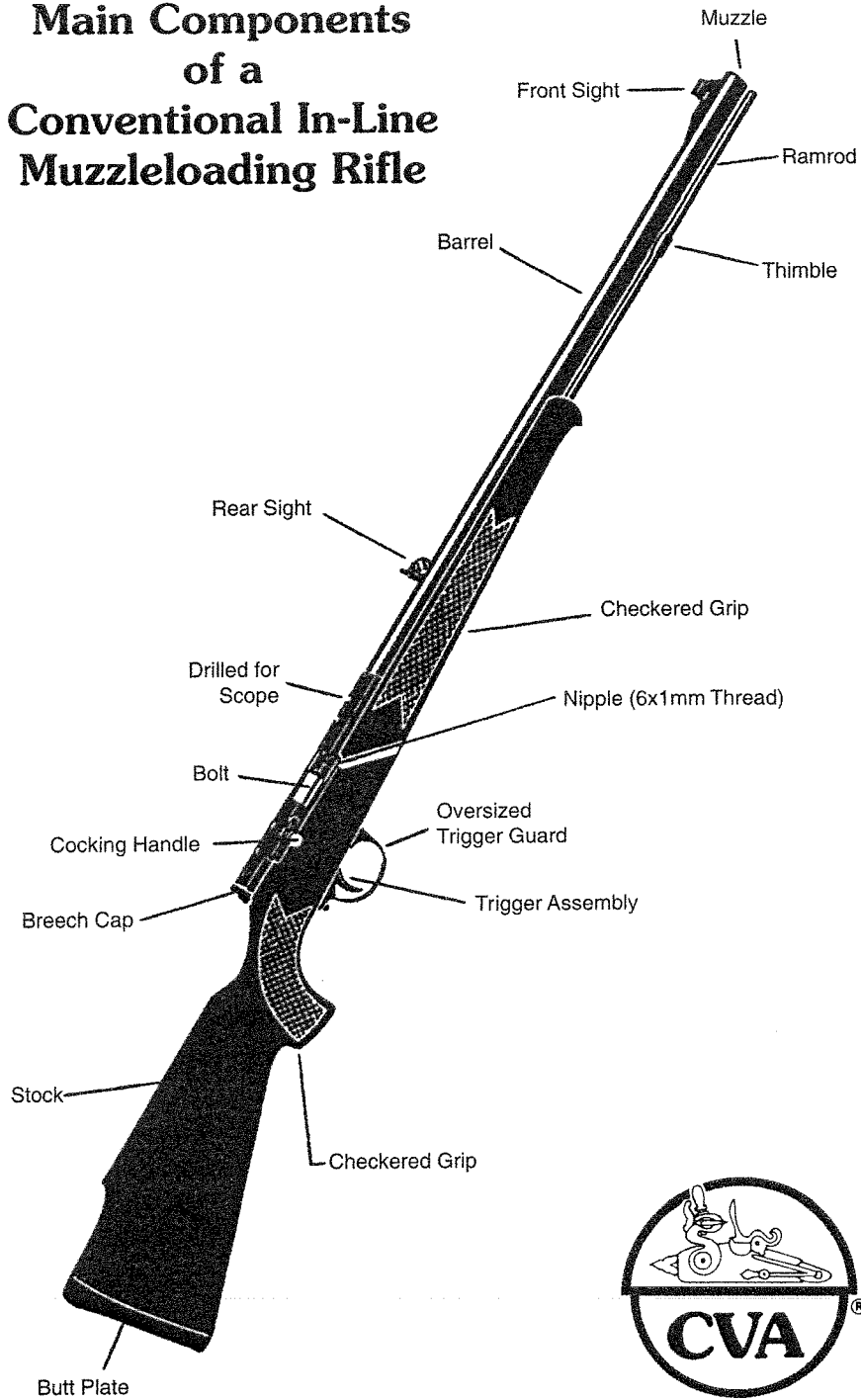




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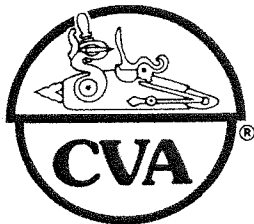
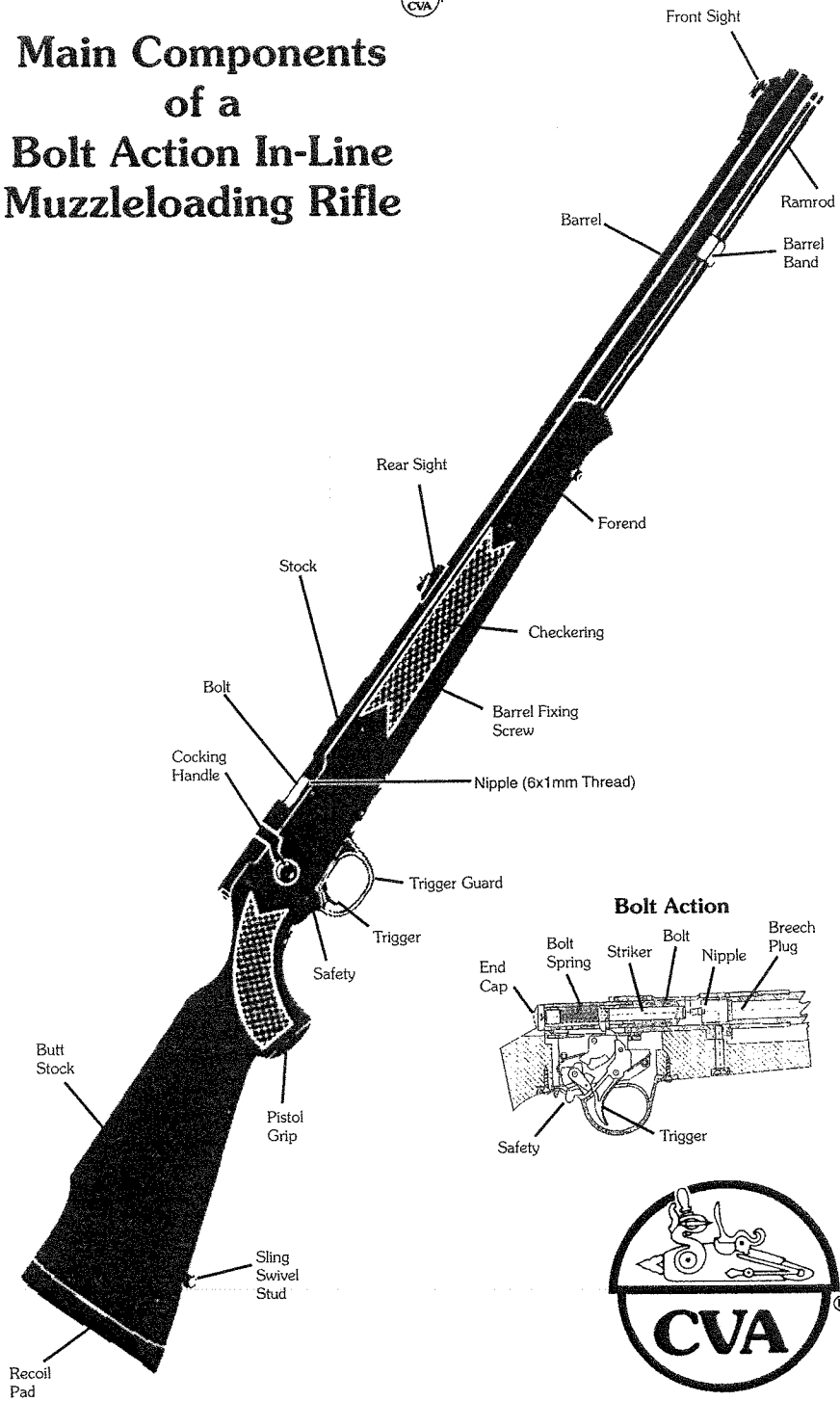
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Main Components of a Bolt Action In-Line Muzzleloading Rifle





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.**

All muzzleloading firearms, including In-Lines, are faithful to the original basic designs. For this reason, blackpowder guns cannot be made with many of the refinements and features that are standard on modern cartridge firearms. Shooters must remember that even now, despite the modern appearance of In-Line design rifles, there is no way to build a muzzleloader that absolves the user from the need to use the special safety precautions and good judgement unique to all muzzleloading firearms. However, 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 the safe handling and shooting of a muzzleloader, return the firearm in its entirety to the place of purchase. If you have any questions about 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

If you sell, trade, or give this firearm to any other person - this owner's manual must accompany the firearm. Replacement books are available from CVA.

A. INTRODUCTION TO IN-LINE MUZZLELOADERS

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

Among In-Line design muzzleloaders, there are two distinct categories of rifles which are differentiated by their cocking mechanisms. The first, and earliest design, is called **CONVENTIONAL IN-LINE** and features a straight-pull cocking device. The second, and most recent design, is called **BOLT ACTION IN-LINE** and utilizes a bolt action style cocking mechanism similar to that of a modern center-fire rifle.

In the Conventional In-Line category, CVA offers two series of rifles — **Stag Horn** and **Eclipse**. Stag Horn Series rifles are basic in design and incorporate a manual “notch” safety system. Eclipse Series rifles are offered with a number of feature upgrades and all use an “automatic” safety system.

CVA has two series of Bolt Action In-Lines — **FireBolt™** and **HunterBolt**. FireBolt™ rifles are CVA's top of the line Bolt Action In-Lines and feature many upgrade features, including light gathering sights, bullet guiding muzzle, recoil



pad and stainless steel bolt. HunterBolt rifles are CVA's more basic bolt actions.

All CVA Bolt Action In-Lines are capable of handling the heavier, multiple Pyrodex Pellet "magnum" loads. Such loads may require the use of the hotter Musket Cap (using the CVA Musket Cap Nipple) and a sabot bullet weighing 300 grains or less. Such "magnum" loads should never be fired in CVA Conventional In-Lines (Eclipse and Stag Horn).

B. GETTING STARTED

1. Safety First - Verify gun is unloaded.
2. Assemble gun.
3. Check all functions.
4. Remove nipple (and breech plug if In-Line).
Clean and check opening.
Apply breech plug grease to threads.
5. Clean barrel.
6. Replace and tighten breech plug and 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-Line 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 dangerously 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 bolt and safety 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 or bolt of a muzzleloader to rest against the cap. Any impact to the hammer or bolt could cause accidental discharge.



16. Never rely upon a mechanical 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 IN-LINE 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 of CVA In-Line. CVA Bolt Action In-Lines (FireBolt™ and HunterBolt models) are capable of firing heavier "magnum" loads using Pyrodex Pellets. CVA Conventional In-Lines (Eclipse and Stag Horn models) are not designed to fire such loads. The use of "magnum" pellet loads in any CVA rifle other than Bolt Action In-Line models is not recommended.
2. "Magnum loads" for CVA Bolt Action In-Lines are safe only when using Pyrodex Pellets. "Magnum" loads of loose blackpowder or Pyrodex are unsafe and should never be attempted. Only FireBolt™ and HunterBolt models are approved for Pyrodex Pellet loads in excess of 100 grains.
3. Always follow recommended loading data when selecting bullet type and weight. When using sabot bullets and Pyrodex Pellets, maximum bullet weight should not exceed 300 grains. With loose powder loads, conical lead bullets should never exceed 400 grains.
4. Always use Musket Caps and the CVA MusketMag™ Musket Cap Nipple (AC1425) when firing multiple (2 or more) Pyrodex Pellet loads. The extra fire to the charge ensures efficient burn of the entire pellet charge.



5. Always use sabot bullets when using Pyrodex Pellets. Sabots provide the tight gas seal necessary for efficient burn of the entire pellet charge.
6. When using multiple 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.
7. Round ball and patch loads are not recommended for CVA In-Line rifles.
8. 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 the gun, causing severe injury or death to the shooter and bystanders.
9. Never use "Poly Patch" in any CVA rifle.

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. Four approved methods to remove a projectile from the barrel are to: (1) Use a CO₂ discharger to blow the projectile from the barrel; (2) Remove the percussion nipple from the breech plug and work powder into the flash channel. Replace the nipple, recap and 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) With the muzzle in a safe direction, remove the barreled action making sure that the percussion cap (and any excess fulminate) is removed from the nipple. Remove the bolt, nipple and breech plug (see page 13 & 14). Empty the powder into a safe container. Using the ramrod and cleaning jag with a solvent soaked cleaning patch, push the bullet from the breech forward and out the muzzle of the barrel.



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.

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.

G. BASIC ACCESSORIES FOR A MUZZLELOADER

1. **LOADING ACCESSORIES**

Propellant - Blackpowder or acceptable substitute such as Pyrodex or Pyrodex pellets. 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.

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...

- | | |
|--------------|--|
| FG | (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. |
| FFG | (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. |
| FFFG | (Commonly called Triple "F") It is used in all percussion revolvers, most single shot pistols, and most of the smaller (under .45 caliber) rifles. |
| FFFFG | (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:

- | | |
|---|---|
| PYRODEX RS (rifle & shotgun) | Designed for use in all calibers of percussion muzzleloading rifles and shotguns. Pyrodex Select has similar loading characteristics to RS. |
| PYRODEX P (pistol powder) | Designed for use in percussion muzzleloading pistols and cap & ball revolvers. Also used in small caliber rifles. |



PYRODEX CTG (cartridge powder)

Designed for use in blackpowder cartridges. This powder is not suited for use in muzzleloading firearms.

The third type of propellant acceptable for CVA In-Line rifles is PYRODEX PELLETS.

Pyrodex Pellets for .50 caliber come in two grain equivalents (as of this printing 3/99) – 50 grains and 30 grains. Pellets may be combined into multiple pellet loads to create several different grain equivalent loads. Pyrodex pellets are available in 60 grain equivalents for .54 caliber in-line rifles.

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 In-Line rifles the Musket Cap ignition system is recommended. This system provides the hotter flash necessary to ensure efficient ignition of the entire pellet charge.

Pyrodex Pellets is the only propellant which can be used to create “magnum” loads for CVA Bolt Action style rifles (FireBolt™ and HunterBolt models). The maximum load is a 150 grain equivalent (3 of the 50 grain pellets). While this is the maximum load it is not necessarily the optimal load for most shooters. Such “magnum” loads are not necessary in most hunting situations and will deliver a heavy recoil that may not be desirable. In all other CVA In-Line .50 caliber rifles (Eclipse and Stag Horn models), no Pyrodex Pellet load in excess of 100 grains should ever be used.

I. 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.

NOTE: MUZZLELOADING PROJECTILES MUST BE MADE FROM PURE LEAD. LINOTYPE OR WHEEL WEIGHT LEADS CONTAIN ANTIMONY WHICH CREATES AN EXTREMELY HARD, OVERSIZED 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 or visit us on the Internet at www.cva.com or E-Mail us at: info@cva.com



1. **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 1-D,C)

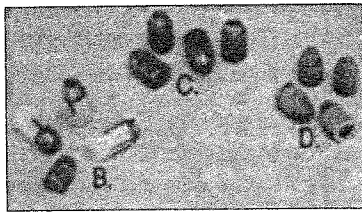


Figure 1

2. **SABOTED BULLETS**—Don't confuse the term "sabot" with "poly patch". Poly Patch is designed for use with round balls only, should be considered highly dangerous to use, and not recommended for use in CVA rifles. 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. Saboted bullets of 300 grains weight or less are required when using Pyrodex Pellets as a propellant. When shooting sabots, one patch cleaning between shots is recommended. (Figure 1-B)

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

J. RECOMMENDED LOADING DATA

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 TYPE	CHARGE TYPE	CHARGES IN GRAINS	
			MINIMUM	MAXIMUM
.50	.50 Conical	Powder FFG	50	100
.54	.54 Conical	Powder FFG	60	110
.50	.50 Sabot	Powder FFG	50	90
.54	.54 Sabot	Powder FFG	60	100
.50	.50 Sabot	Pellet	50	100
.54	.54 Sabot	Pellet	60	120
.50	.50 Sabot	"Magnum Pellet"	50	150*



*WARNING: This is a "Magnum" charge and can only be safely loaded in CVA Bolt Action models (FireBolt™ and HunterBolt). Pyrodex Pellets is the only approved propellant for a 150 grain charge. A sabot bullet with a weight of 300 grains or less is the only approved projectile. While this is the maximum load for these model rifles it is not necessarily the optimal load for most shooters. Such "magnum" loads are not necessary in most hunting situation and will deliver a heavy recoil that may not be desirable.

K. LOADING AND SHOOTING CVA IN-LINE MUZZLELOADERS

ATTENTION: Many manufacturers, including CVA, are now promoting guns which are designed to shoot heavier than standard powder charges. Shooters may 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.

1. Wear shatterproof shooting glasses and ear plugs or muffs to protect yourself from sparks, bits of fragmented caps, and hearing loss.
2. Verify the rifle is not loaded.
 - a. Place ramrod down the barrel to breech plug and mark ramrod at the muzzle.
 - b. Remove ramrod and lay along outside of barrel, lining up mark at muzzle.
 - c. The end should be at the base of the breech plug. If rod does not line up, assume the rifle is loaded and that it should be disarmed before proceeding.
3. Check to make sure that breech plug and nipple are snugly screwed into place. Do not overtighten.
4. Pulling the bolt to the rear with Eclipse Rifles will engage the trigger safety (all other CVA models require the manual setting of the safety mechanism to the "safe" position). Insure the trigger does not release the bolt.
5. Clean all oil and grease from barrel interior.
6. With the rifle pointed in a safe direction, place a percussion cap on the nipple.

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

7. Release the safeties and fire cap to insure bore and nipple are dry of solvent or moisture. Repeat minimum of three (3) times.

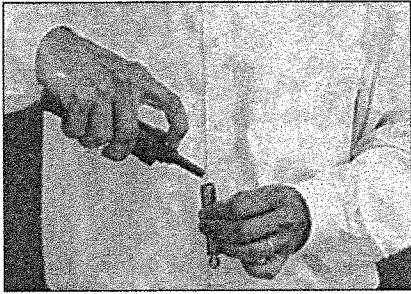


Figure 2

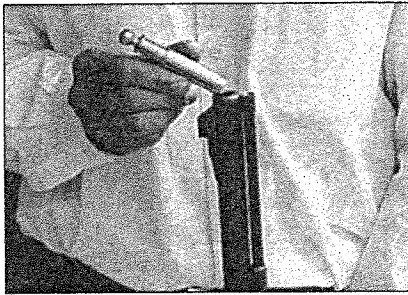


Figure 3

8. Pour powder from flask into a powder measure that is set for correct powder charge (See Figure 2).
9. With the muzzle pointed "up" and no part of your body extended over the gun, pour a measured charge down the barrel. (See suitable charges—Table 1, Page 9)(See Figures 2 and 3).

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.

10. Slap side of barrel in front of receiver. This will help insure that powder will fully enter the breech and nipple area.
11. For Lubricated Bullet and Saboted Bullet:
 - a. Make sure bullet is lubricated. Sabots require no additional lubrication.
 - b. Start the bullet or sabot bullet into the bore with your fingers, making sure it is centered.
 - c. Use short end of bullet starter to press bullet just into muzzle. (See Figure 5).
12. Use longer end of ball starter to move projectile about six inches down the bore. (See Figure 6).
13. With ramrod, push projectile down on top of powder, firmly, but without crushing the powder. (See Figure 7).

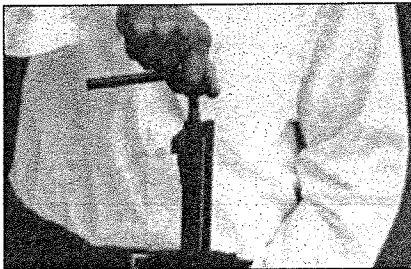


Figure 5

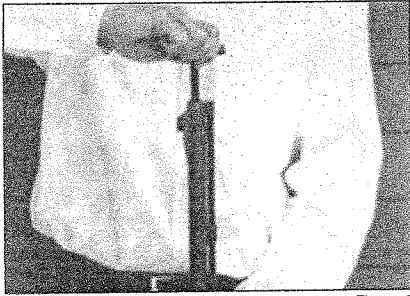


Figure 6



Figure 7

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.

IMPORTANT: Be sure projectile is seated firmly against powder. No air space should exist between projectile and powder.

14. WITH GUN POINTED IN SAFE DIRECTION and bolt locked to the rear, place a percussion cap on nipple. THE GUN IS NOW LOADED.(See Figure 8).

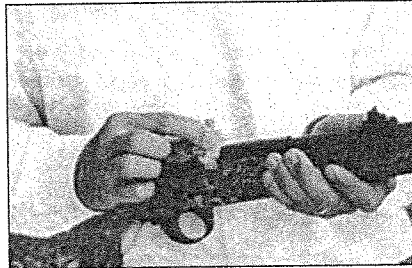


Figure 8

15. Release the safety and YOU ARE READY TO FIRE.
16. Aim at target. Squeezing trigger will cause the bolt to fall on cap and the gun will 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 the gun pointed at the target.
- Using the ramrod, reseal the ball or bullet on the powder.
 - 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.

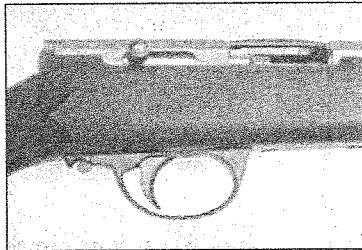
- Never attempt to shoot out a projectile which is not firmly seated against powder charge. The ball and powder charge should be removed using a ball puller. See Section P, Removing A Charge.
- Go back to Step 1 and repeat, being sure bore and nipple are clean and free of obstructions and moisture.



L. Safety Systems

WARNING: Never rely on any mechanical safety.

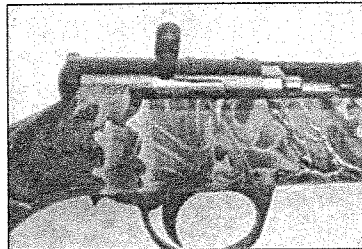
1. All **Eclipse Series** rifles are equipped with an Auto Safety. The automatic trigger safety is located at the rear of the trigger guard. This safety is designed to automatically engage each time the bolt falls forward. To disengage the safety, press the safety button to the rear. Green indicates safety-on, red is safety-off (Figure 9).



Automatic Safety

Figure 9

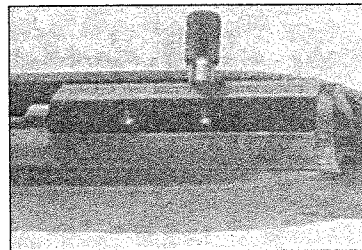
2. All **Staghorn Series** rifles are equipped with a manual safety. The manual safety is engaged by pulling the bolt to the rear until it locks in position; then simply flip the cocking bolt upward until it engages the breech notch. The gun will then be on "safe". To disengage the safety, flip the locking bolt down into the cocked or "fire" position (Fig. 10).



Manual Notch Safety

Figure 10

3. All **Firebolt™ and HunterBolt Series** bolt action rifles are equipped with a trigger blocking safety, which is located behind the trigger guard. This safety should not be confused with the automatic safety found on Eclipse series rifles. The safety should manually be engaged to the forward (green) position for safe setting (Fig. 11).



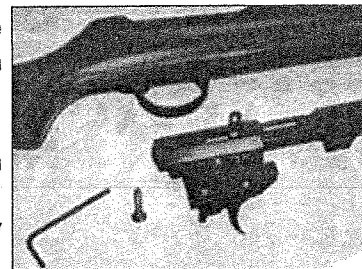
Trigger Blocking Safety

Figure 11

M. CONVENTIONAL IN-LINE DISASSEMBLY/ASSEMBLY FOR CLEANING AND MAINTENANCE. (FIGURE 12)

NOTE: Before beginning this procedure make sure gun is unloaded. (See Step 2 of Section K).

1. Remove ramrod from gun.
2. Loosen and remove the hex screw from the underside of the stock.
3. Remove the barrel/receiver assembly from the stock.





4. Unscrew and remove the cap at the rear of the receiver. Percussion bolt should be in the uncocked position prior to unscrewing cap.
5. Remove the bolt spring(s).
6. Unscrew the handle from the percussion bolt by twisting counter clockwise.
7. Loosen and remove the two (2) hex screws which mount the trigger mechanism to the receiver and remove trigger mechanism.
8. Remove bolt by sliding out through the rear of the receiver.
9. Remove the nipple for cleaning, as outlined in the next section, by engaging the nipple with the specially supplied nipple wrench and turning in a counter-clockwise motion.
10. The breech plug is removed with the tool supplied. The slotted end removes the nipple. The screw driver end removes the breech plug. The steel rod slides through the tool acting as a handle.
11. Clean barrel according to instructions found in Cleaning and Maintenance Section. (Section O)
12. Do not attempt to disassemble the trigger assembly. Clean as a one-piece unit.
13. Avoid prolonged exposure to water or solvents when cleaning wood stock guns. Damage to the finish could result. Treat with good quality stock wax or polish to preserve finish and protect from weather damage.
14. Reassemble the rifle by reversing the order of disassembly. NOTE: On Stag Horn Series/Manual Safety Models make sure that spring tip is inserted into small hole in back of bolt.
15. Preparation Before Loading
 - a. Insure no obstructions are present in the barrel.
 - b. Insure barrel is clean and dry before loading. Fire several caps through the rifle before loading powder to eliminate any moisture or solvent remaining in the barrel.
 - c. Insure bolt locks in place to the rear and be certain safety is engaged. Insure the trigger does not activate the bolt before placing a percussion cap on the nipple.

DO NOT ATTEMPT TO USE THIS RIFLE IF ANY OF THE SAFETY MECHANISMS DO NOT OPERATE PROPERLY. CHECK WITH A COMPETENT GUNSMITH TO CORRECT THE PROBLEM, AS ACCIDENTAL FIRING MAY RESULT.

NOTE: CHECK BREECH PLUG FOR SNUG FIT WITH THE BREECH WRENCH. ATTACH THE WRENCH FROM THE REAR OF THE RECEIVER. TURN CLOCKWISE.



N. BOLT ACTION DISASSEMBLY/ASSEMBLY AND CLEANING

1. Check to ensure gun is unloaded.
2. Remove bolt stop screw with allen wrench. (Located on left side of the receiver, opposite side of the cocking handle).
3. Remove end cap with allen wrench (conventional or T-shaped). CAUTION: Cap is under spring pressure. Point in safe direction. Try to keep end cap covered with your hand. (Fig. 13)

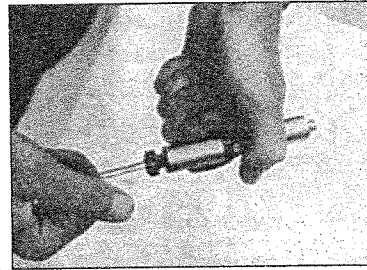


Figure 13

4. Lift bolt handle up - pull bolt out of the receiver toward the rear of the barrel.
5. Remove rear bushing, spring, striker and bolt handle.
6. Clean all parts with toothbrush and solvent.
7. Dry all parts thoroughly and lubricate.
8. Reassemble bolt handle, striker, bushing and spring. (Fig. 14)
9. Move bolt handle to uncocked position. (Fig. 15)

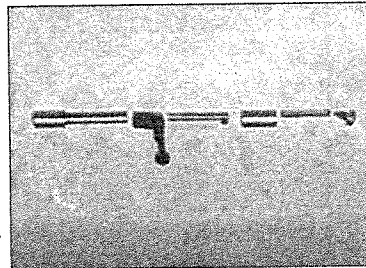


Figure 14

10. Start end cap two turns only into bolt body using allen wrench.
11. Place striker pointed down on a table (or other hard nonslip surface) while pushing end cap down with the palm of your hand; twist bolt handle counter clockwise to the cocked position.
12. Completely tighten end cap with allen wrench.
13. Follow steps 1-3 of Section M to remove barrel from stock.
14. Follow steps 9-14 in Section M.
15. Return bolt to receiver.
16. Replace bolt stop screw and tighten using allen wrench. (Be careful not to over tighten).
17. Follow Step 15 in Section M.

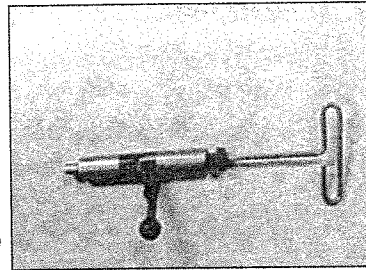


Figure 15

O. CLEANING AND MAINTENANCE

Blackpowder and Pyrodex are very corrosive. Therefore, careful cleaning of your muzzleloading 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.



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 In-Line CVA rifles follows.

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

1. Remove the barrel from the stock.
2. For thorough cleaning, disassemble gun as instructed in section M or N. For quick cleaning leave Breech Plug in and clean the barrel while still assembled.
3. Remove trigger assembly and clean separately.
4. Attach a cleaning jag to the ramrod.
5. 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.
6. Pump the rod and patch up and down in the barrel, drawing soapy water into and through the barrel. HELPFUL HINT: The nipple should always be removed for cleaning.
7. Replace cleaning patches as often as needed until barrel is clean of all signs of fouling.
8. When completed, wipe off all excess water and dry barrel thoroughly.
9. Clean fouling on the stock and exterior parts by wiping with an oily cloth.
10. Oil the barrel inside and out well and reassemble the firearm.

*All oils should be natural; NO PETROLEUM PRODUCTS.

P. REMOVING 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 removed.

THE TWO MOST COMMON CONDITIONS ARE AS FOLLOWS:

1. If the projectile is not seated firmly against the powder charge, stop immediately! Do not attempt to fire the rifle. You must remove the charge and clean the barrel.
2. If the rifle is loaded in a proper manner yet fails to fire after repeated attempts (as explained in the "Loading and Shooting" Section).

NEVER ATTEMPT TO PULL A CHARGE UNTIL THE POWDER HAS BEEN RENDERED INERT (DEACTIVATED) BY THOROUGHLY SOAKING IN WATER.



Removing a projectile is dangerous when there is a powder charge behind the projectile. Four approved methods to remove a projectile from the barrel are to: (1) Use a CO₂ discharger to blow the projectile from the barrel; (2) Remove the nipple from the breech plug and work powder into the flash channel. Replace the nipple, recap or reprime to discharge; or (3) With the muzzle in a safe direction, remove the barrel action making sure that the percussion cap (and any excess fulminate) is removed from the nipple. Remove the bolt, nipple and breech plug (see section M, N). Empty the powder into a safe container. Using the ramrod and cleaning jag with a solvent soaked cleaning patch, push the projectile from the breech forward and out the muzzle of the barrel; or (4) 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.

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.

Q. SIGHT ADJUSTMENTS

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

1. Adjust the rear sight for elevation by loosening the retaining screw and sliding the sight up the ramp to raise the point of impact or down the ramp to lower the point of impact.
2. Adjust the rear sight for windage by loosening the retaining screw so that sight will slide to the left or right. To move the point of impact to the right, move rear sight to the right. To move the point of impact to the left, move rear sight to the left.

R. SCOPE MOUNTING

CVA In-Line rifles are drilled and tapped for easy scope installation. 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. Scopes should be mounted according to manufacturer's instructions. CVA's Rapid Remount Scope Mount System™ (AC1655) allows the shooter the option of a quick detachable scope mounting system, that returns to the zero point when reinstalled.



S. SIGHTING IN A SCOPED RIFLE

1. Safety first - Gun unloaded.
2. Scope mounted and bore sighted.
3. Load gun.
4. Start at 25 yards. Shoot three shot group.
5. Adjust scope to center of group. Should be 1" high at 25 yards to be zero at 100 yards.
6. Clean gun.
7. Repeat process of 3 shot group until sighted-in. Check at 50 and 100 yards.

T. 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 "foul 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 grooves, 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.

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.



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.

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 **VOLUMETRICALLY** 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.

HEAVIER "MAGNUM" LOADS

Some rifle models allow the use of heavier loads when using Pyrodex Pellets. Check Section J of this book to verify maximum loads for your rifle.

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 muzzle-loader 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 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.

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, lightly clean the barrel with a 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!



U. 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 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 .50 Caliber In-Lines

Projectile	Muzzle Velocity	100 Yard Velocity	Velocity Lost	% Velocity Lost
300 GR Buckslayer™ Bullet	1473	1179	294	20%
225 GR Sabot	1666	1333	333	20%

It is easily noted that the Buckslayer™ Bullet and 225 Gr. Sabot loses only 20 percent of their velocity in the first 100 yards.

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 In-Line (pg. 23) the sabot has 1387 foot pounds of energy at the muzzle, but only 888 foot pounds of energy @ 100 yards. From this data most hunters would properly assume that the maximum effective range for a sabot with 90 gr. ffg blackpowder fired from an In-Line .50 caliber rifle to be somewhat greater than 100 yards.



For elk size game, the rule is 1,000 foot pounds of energy for effective harvest. Referring to the table for the In-Line .50 caliber rifle, using the 300 grain CVA Buckslayer™ Bullet, 90 grain FFg Blackpowder, we find 926 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 In-Line, firing a 375 grain Buckslayer™ Bullet, with 100 grains FFg blackpowder on the following page we can see the 100 yard energy to be 1119 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. 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

Is given to help short cut range time. 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. In the case of the .50 caliber CVA In-Line / 300 grain CVA Buckslayer™ bullet combination, the table shows +1.5 in the 25 yard column under trajectory sight in information. The shooter's point of aim should be the center of the bullseye 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 bullseye, the 50 yard point of impact should be 2-1/2 inches above the center of the bullseye. The group from 100 yards should be close to the bulls eye. Shoot from the 100 yard position, making sight adjustment until the group centers on the bulls 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.



Manufacturer: Connecticut Valley Arms
Name of Gun: Firebolt, HunterBolt, Eclipse & Stag Horn Model In-Lines
Caliber: .50
Rate of Twist: 1 in 32" **Barrel Length:** 24"
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	1473	1446	1179	926	.75"
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	1666	1387	1333	888	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	1380	1628	1077	992	1.5"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+1.75	+3.0	0	-5.5



Manufacturer: Connecticut Valley Arms
Name of Gun: Firebolt, HunterBolt, Eclipse & Stag Horn Model In-Lines
Caliber: .54
Rate of Twist: 1 in 32" **Barrel Length:** 24"
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
375 Grain CVA Buckslayer Bullet	100 GR	1414	1665	1159	1119	0.5"
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	1697	1439	1358	922	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	1443	1966	1183	1321	1.0"
Trajectory Sight in Information (in inches)			25 Yards	50 Yards	100 Yards	125 Yards
			+2.0	+2.5	0	-5



BALLISTICS GUIDE

PISTOL BULLET
AND SABOT
(240 GRAINS)

300 GRAIN
BUCKSLAYER
PRELUBED BULLET

YD	DROP	DRIFT	ENERGY	DROP	DRIFT	ENERGY
50	+1.5	.9	1090	+7.2	1.2	1150
75	+1.3	2.0	990	+4.3	2.8	1013
100	0	3.5	900	0	5.0	900
125	-2.5	5.6	820	-5.9	7.9	815
150	-6.0	8.1	750	-13.6	11.3	746
175	-11.0	11.1	695	-23.1	15.2	695
200	-18.0	14.5	646	-34.8	19.6	646

TEST DATA .50 CALIBER RIFLE
90 GRAINS PYRODEX (RS)
10 MPH WIND

V. 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, Inc. 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, Inc. 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.

W. 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.

X. 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.



Y. LIMITED LIFETIME WARRANTY

Connecticut Valley Arms, Inc., (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 barrel from receiver.

Address all inquiries and correspondence to:

Connecticut Valley Arms, Inc.
5988 Peachtree Corners East
Norcross, GA 30071

SIDELOCK RIFLE LOADING DATA

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	90 FFG
.54 RIFLE	.54 SABOT	NONE	50 FFG	90 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

If any questions, call CVA at 770-449-4687 or write:

CVA, 5988 Peachtree Corners East, Norcross, GA 30071

IN-LINE RIFLE LOADING DATA

CALIBER FIREARM	PROJECTILE TYPE	CHARGE TYPE	CHARGES IN GRAINS	
			MINIMUM	MAXIMUM
.50	.50 Conical	Powder FFG	50	100
.54	.54 Conical	Powder FFG	60	110
.50	.50 Sabot	Powder FFG	50	90
.54	.54 Sabot	Powder FFG	60	100
.50	.50 Sabot	Pellet	50	100
.54	.54 Sabot	Pellet	60	120
.50	.50 Sabot	"Magnum Pellet"	50	150*

If any questions, call CVA at 770-449-4687 or write:
CVA, 5988 Peachtree Corners East, Norcross, GA 30071

Place
Stamp
Here

CVA
5988 Peachtree Corners East
Norcross, GA 30071

WARRANTY CARD (Please complete all sections)

Name _____ Phone (____) _____
Street _____
City _____ State _____ Zip _____
Store Name _____ Date Purchased _____
Street _____ City _____ State _____ Zip _____
Product: _____
Caliber _____ Model # _____ Serial No. _____

1. In what type of store was product purchased?

- Gun
- Chain/Discount
- Sporting
- Hardware
- Hobby
- Mail Order

2. Why did you select a CVA product?

- Reputation
- Special Feature
- Recommendation
- Impulse Purchase
- Price
- Intended Use: Hunting Target Shooting
- CVA Advertisement
- Decoration

3. What features do you like?

Are there any features you dislike? _____
What improvements would you recommend? _____



Connecticut Valley Arms, Inc.

5988 Peachtree Corners East
Norcross, Georgia 30071