

LESSON 3: TARGET SHOOTING EQUIPMENT AND ITS OPERATION

PURPOSE

This lesson introduces you to the parts and components of the air rifle, how it functions and how to load and fire it. It also gives you details about the proper clothing and equipment needed for air rifle target shooting.

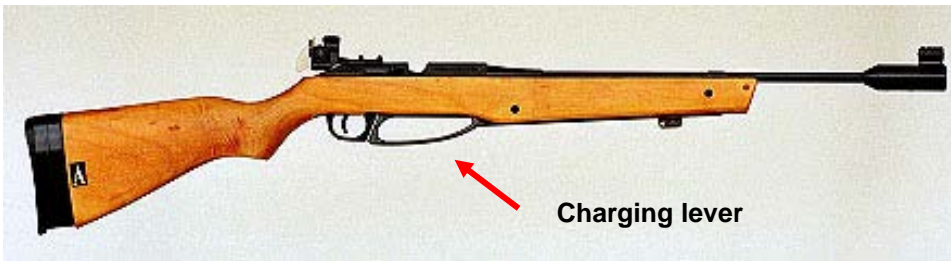


action
charging lever
front sight inserts
kneeling roll
loading port
pistol grip
rear sight blinder
sling swivel

INTRODUCTION

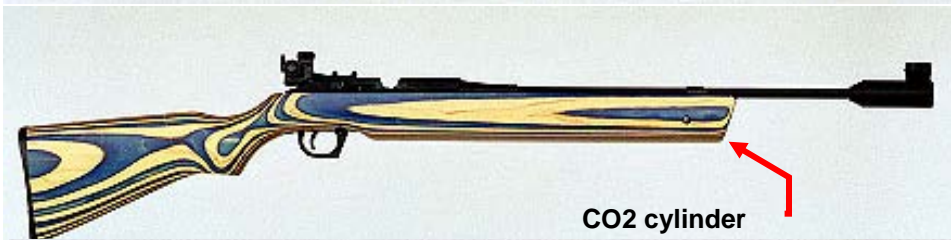
Before you can target shoot on a range, you must know how to handle guns safely. It is also important to know about the purpose and functioning of the air rifles and equipment that you will use. This chapter introduces you to the air rifles and equipment used in JROTC marksmanship training and the basic principles of their operation.

The most common air rifle that is used in JROTC marksmanship training is the Daisy M853 pneumatic air rifle. Some JROTC units have Daisy M753 air rifles that are the same as the M853, except that they have an improved stock design and better sights. Some JROTC units now are acquiring newer Daisy M888, Daisy XS40 or Crosman M2000 CO₂ air rifles. Some units also have various types of precision air rifles. Most of those units, however, reserve these precision air rifles for members of their rifle team.



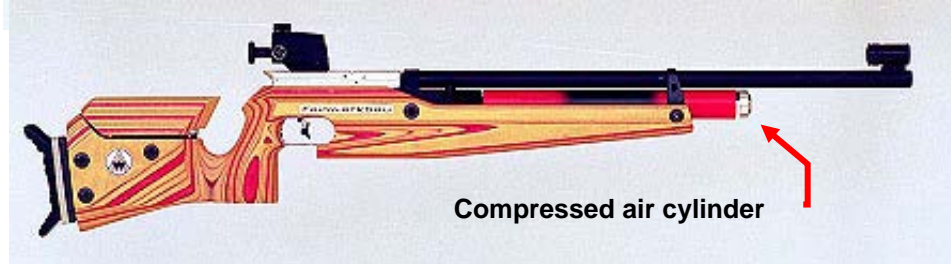
Charging lever

The Daisy M853 air rifle is a pneumatic air rifle. The charging lever is opened and closed to compress air in a chamber. The compressed air is released by a valve when the shot is fired.



CO2 cylinder

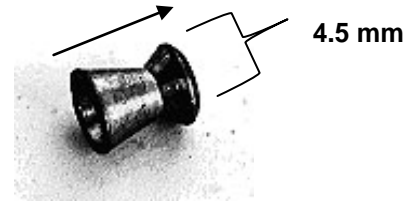
The Daisy M888 air rifle uses compressed carbon dioxide (CO₂) gas contained in a cylinder in the fore end of the stock to provide energy to fire the air rifle pellet.



Compressed air cylinder

The Feinwerkbau P70 Junior is a typical precision class air rifle that uses compressed air contained in a cylinder in the fore end of the stock to provide energy to fire the pellet.

The projectiles used in air rifles are called pellets. They are made of soft lead, are 4.5mm in diameter (.177 cal.), weigh about eight grains (0.50-0.53 grams) and possess about five foot pounds of energy when fired. Air rifle pellets are shaped like badminton shuttlecocks. They have flat, solid heads and hollow skirts that help to stabilize them when they fly to the target. Air rifle pellets must be loaded so that the head is pointed at the target and the skirt is directed to the rear.

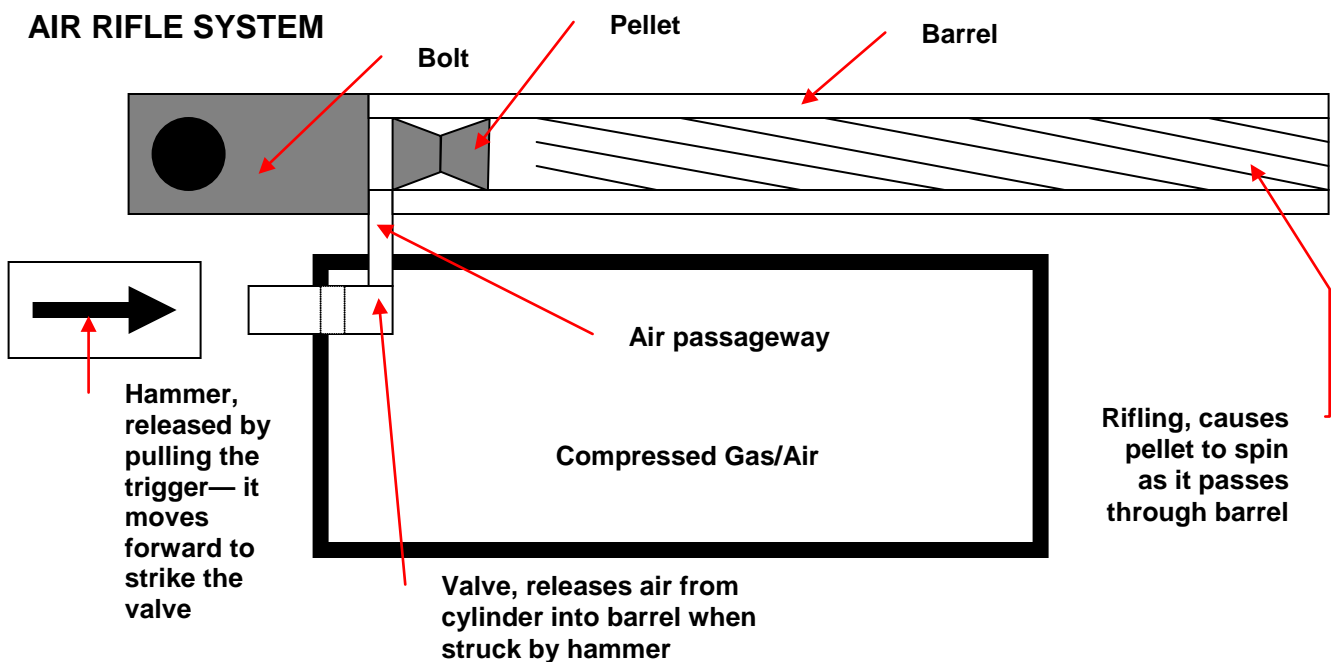


Air Rifle Pellets

HOW AIR GUNS WORK

To fire their projectiles, air rifles utilize energy that is stored in the form of compressed gas. If the air rifle has a pneumatic system, energy is stored when the rifle is cocked. If the air rifle has a CO₂ or compressed air system, a pre-charged cylinder that contains stored energy in the form of compressed air or CO₂ gas is attached to the rifle. Air rifles are fired when the trigger mechanism is activated to open a valve that releases compressed gas into the barrel. This gas expands rapidly into the rear or breech end of the rifle's barrel and drives the projectile through the barrel to the target.

In contrast with air rifles, firearms utilize energy that is stored in the form of gunpowder that is contained in a cartridge. The cartridge also contains a bullet (projectile) and a primer. The cartridge is placed in a chamber at the breech end of the barrel. The cartridge is locked in place by closing the action or bolt. Firearms are fired when the trigger mechanism is activated to release a firing pin that strikes and detonates the primer. The primer explosion then causes the powder to burn and create rapidly expanding gases that drive the projectile through the barrel to the target.



WHAT MAKES RIFLES ACCURATE

When a rifle is fired at a target, two special features that are characteristic of rifles make it possible for the person who fires the rifle to direct the projectile at a precise point on the target. Those features are sights and rifling.

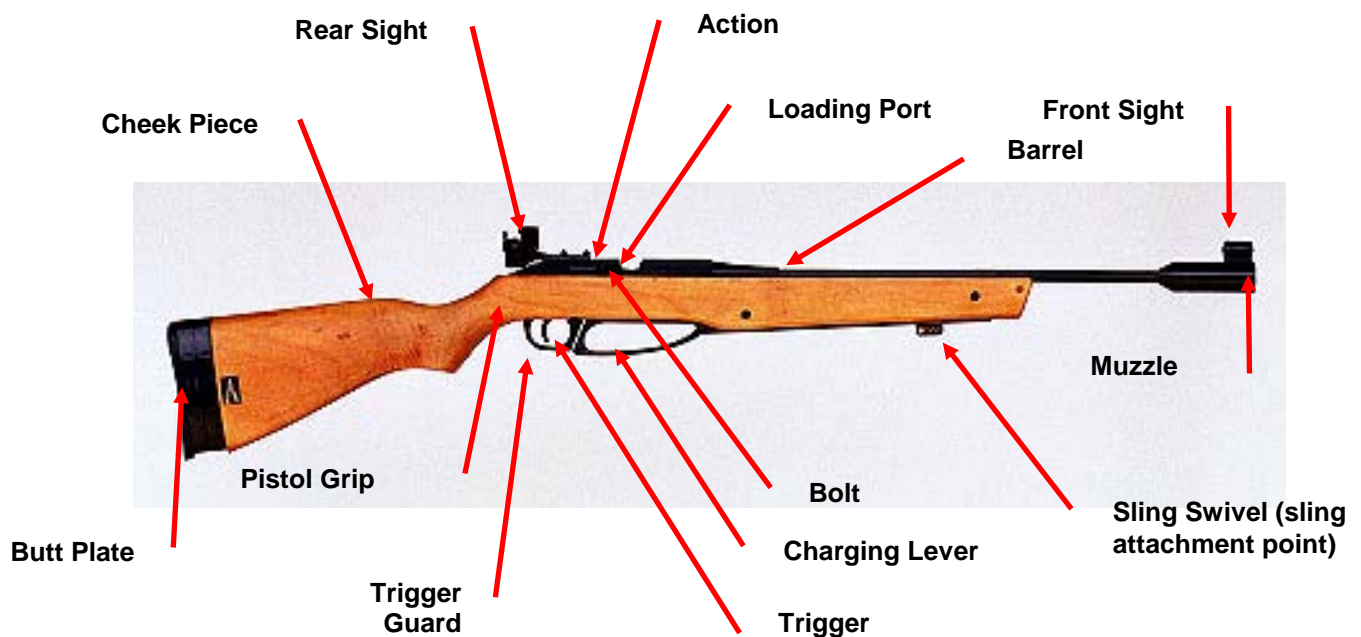
1. **Sights.** All rifles have sights. Target rifles have very precise, adjustable sights. Sights serve as a guidance system for the rifle that is controlled by the person who fires the rifle. The person who holds and fires the rifle looks through the rear and front sights to aim the rifle at the target. To hit the center of the target, the sights must be adjusted so that they point at exactly the same location on the target as the barrel points.

2. **Rifling.** All rifles also have rifling. Rifling is a pattern of flat spiral ridges inside the barrel that cause the pellet or projectile to spin when it leaves the barrel and flies through the air to the target. When a round or cylindrical object travels through air, it becomes unstable. To make that object stable and fly straight, it is necessary to make it spin. A Frisbee flies straight if it is spinning, but when it is not spinning fast enough, it wobbles and flies in unpredictable directions. The same is true of the air rifle pellet.

PARTS OF AN AIR RIFLE

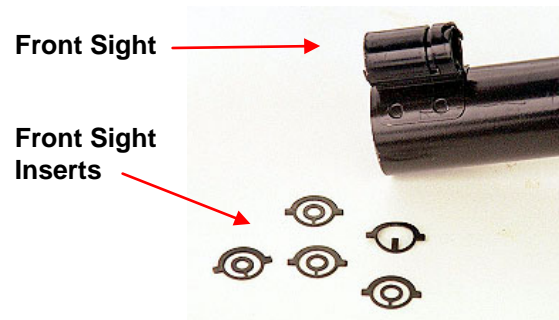
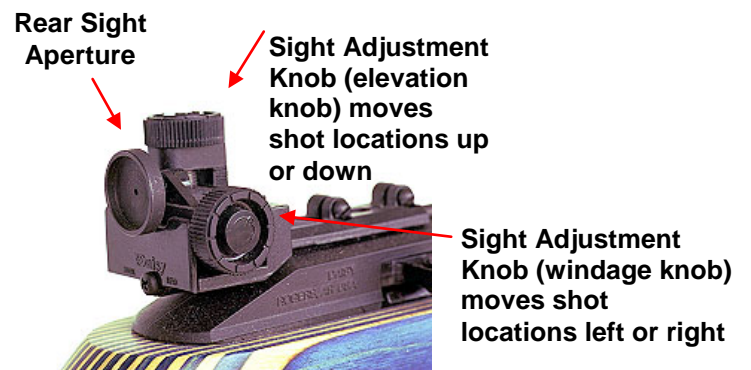
During rifle marksmanship instruction, frequent reference will be made to the different parts of the rifle. In addition to the rifle's basic parts, the muzzle, action, and trigger, it is important to know several other parts of the target air rifle. Learn to identify each of the parts identified on the chart below.

PARTS OF A TARGET AIR RIFLE



- **Bolt.** A handle or lever that is used to open and close the action of the rifle.
- **Loading Port.** The location where the pellet is loaded into the barrel. When the action is opened, the loading port is open so that a pellet may be placed in the breech end of the barrel.
- **Barrel.** A rifled tube that controls and directs the projectile when it is fired.
- **Cheek Piece.** The top part of the butt stock on which the shooter rests his/her cheek while looking through the sights to aim.
- **Charging Lever.** On the Daisy M853, the charging lever is opened and then closed so that a piston can compress air into the air cylinder. Compressed air or CO₂ air rifles do not have charging levers.
- **Trigger Guard.** The trigger guard protects the trigger from catching on clothing or another object. This helps to prevent the trigger from being accidentally pulled.
- **Pistol Grip.** The curved portion of the stock behind the action and trigger. The trigger hand grasps the pistol grip and the index finger of that hand is then extended so that it can pull the trigger to fire the rifle.
- **Rear Sight.** The rear sight has an aiming aperture with a small hole that the shooter looks through during aiming. Rear sights used in target shooting have two adjustment knobs to make it possible for the shots fired to strike where they are aimed. Telescopic sights are not used in position rifle target shooting.

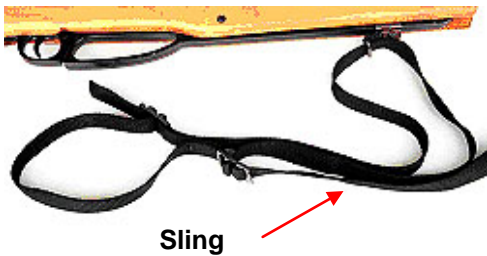
- **Front Sight.** The front sight has a ring or post insert that is used in aiming. The front sight inserts come in different sizes and can be changed so that the correct size front sight aperture is used.
- **Butt Plate.** The plate that covers the rear end of the stock. It is placed on the shooter's shoulder when holding the rifle in a shooting position to fire at a target. The butt plates on most air rifles used by JROTC units have spacers that can be removed or added to adjust the length of the stock. It is very important that each shooter use a stock that is the correct length.
- **Sling Attachment.** Target rifles have a sling swivel or sling attachment point, where the sling that is permitted in prone and kneeling positions is attached. The sling attachment point is normally adjustable forward or backward on the fore end of the rifle.



TARGET SHOOTING EQUIPMENT AND CLOTHING

Only a few items of special target shooting equipment are needed for basic marksmanship training and the first levels of competition. The equipment that is used protects the shooter, assists in holding the rifle steadier, or makes shooting more comfortable.

- **Sling.** A web (or leather) strap that attaches to the fore end of the rifle and has a loop that fits around the upper arm. The sling must be used in the prone and kneeling positions, but cannot be used in the standing position. When properly adjusted so that it is tight, the sling helps to hold the rifle steady.



- **Glove.** Target shooters wear a glove on the hand that supports or holds the rifle. The glove protects the hand from the pressure of the sling when firing in prone and kneeling positions and allows the rifle to rest more comfortably on the hand while holding the rifle in standing position.



- **Kneeling Roll.** A cylindrical cushion that target shooting rules allow to be placed under the ankle when firing in the kneeling position. The kneeling roll provides stability and comfort to the body in that position.



- **Shooting Mat.** A mat that target shooting rules allow shooters to lie on when firing from the prone position.



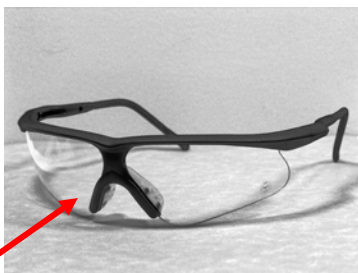
- **Rear Sight Blinder.** An attachment that is often used on the rear sight to block the view of the non-aiming eye. Blinders are usually home-made from cardboard or a strip of plastic cut from a milk carton.



PERSONAL CLOTHING AND EQUIPMENT

Advanced competition shooters wear very specialized clothing such as shooting jackets, shooting pants and shooting boots. This special clothing is not necessary to practice the basic skills of target shooting. In fact, in sporter class air rifle competitions in which many JROTC rifle teams participate, this specialized equipment is not permitted. The following items of personal clothing and equipment are the minimum required for a safe, comfortable target shooting experience.

- Eye Glasses or Safety Glasses.** One of the most important requirements for a target shooter is to be able to see well. Anyone who normally wears eyeglasses should wear them during shooting. Many champion shooters wear corrective lenses so there is absolutely no disadvantage to anyone who wears glasses. There is also an extremely remote chance that a lead pellet fragment will be bouncing back to the firing line. For this reason, it is recommended that all air rifle shooters wear either their personal eyeglasses or safety glasses to provide full protection for their eyes.



Safety glasses used for shooting should have a clear, distortion free area near the bridge for the nose. Target shooters look through this part of the lens when aiming.

- Hearing Protection.** Wearing ear muffs or ear plugs is required when using firearms in order to protect against hearing loss caused by loud impulse sounds. Air rifles generate much less sound and hearing protection is not required to protect against noise generated by air rifles. Some air rifle shooters, nevertheless, wear earplugs to reduce the sounds of air rifle firing and to help them concentrate.



- Clothing.** Almost any clothing may be worn during basic marksmanship instruction, although a sweatshirt or long-sleeved shirt is preferred. In sporter class air rifle competitions, a maximum of two sweatshirts and low-cut shoes only may be worn.



Sweatshirt or long-sleeved shirt

LOADING AND FIRING AN AIR RIFLE

To fire air rifles at targets, it is necessary for shooters to know how to charge, load, and fire them. Depending upon the type of air rifle used, there are three or four steps in doing this.

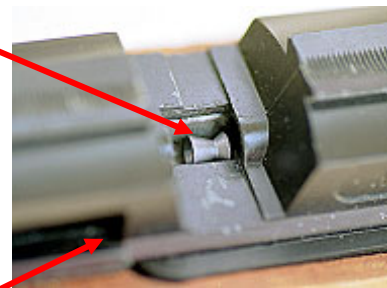
- **Step 1 – Open the Bolt.** The first step in loading and firing an air rifle is to open the bolt or loading port of the action. Opening the bolt cocks the trigger and firing mechanism.
- **Step 2 – Charge the Air Chamber.** This step is not necessary if a compressed air or CO₂ air rifle is used. With pneumatic air rifles such as the Daisy M853, charge the air chamber by opening and fully extending the charging lever. Pause for a second to allow air to fully enter the chamber and then close the charging lever. Target air rifles such as the M853 cannot be double-charged. When the air chamber is charged by working the charging lever once, opening the charging lever again will simply release the air from the chamber and the chamber must be charged again by closing the charging lever.
- **Step 3 – Load Pellet.** To load a pellet in the Daisy M853 or M888, place the pellet in the loading port. Then push the bolt forward to seat the pellet in the breech end of the barrel. With precision air rifles the pellet is seated directly into the breech end of the barrel.
- **Step 4 – Release Trigger.** With the loaded rifle pointing at the target, the shot is fired by smoothly pressing the trigger to the rear until this releases the firing mechanism.

- **Dry Firing.** Dry firing is done by opening and closing the bolt or cocking mechanism without either charging the air chamber or loading a pellet. With a cocked, but unloaded, air rifle it is possible to simulate firing a shot. This simulation or dry firing is one of the best ways to learn and practice proper shooting techniques.



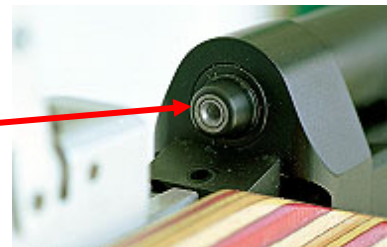
Cock the pneumatic air rifle by opening and fully extending the charging lever. Wait one second and then close the lever.

To load the Daisy M853/M888, place a pellet in the loading port and close the bolt by pushing it forward.



Complete loading by pushing bolt forward to seat pellet in breech

To load the precision air rifle, fully seat the pellet in the breech end of the barrel with the finger or thumb.



CONCLUSION

After you learn the essential parts and components of the air rifle you will be using and how to load and fire it, you are ready to learn the first skills of target rifle marksmanship.