



# Benchrest Shooting

A quick guide

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## BASIC TECHNICAL INFORMATION

# WHAT YOU WILL NEED

- ❖ **RIFLE** – a single shot .22 smallbore rifle for 20, 50 & 90 metre shooting.  
*Note:* always seek advice from experienced coaches or shooters prior to considering making any purchase of new or second hand equipment. Remember that these days, many benchrest stock are specifically made to only shoot bench and shaped accordingly for greater stability.

Below are examples of both ISSF smallbore (left) and a typical Benchrest rifle (right)



- ❖ **BULLET BLOCK** – large enough to hold the required number of bullets, and has a lid to protect the ammunition from rain and dust.
- ❖ **HEARING PROTECTION & SHOOTING GLASSES** – it is essential to use glasses, ear muffs / plugs on the range.
- ❖ **FIRM SOLED SHOES** for benchrest shooting to provide a stable base for your position.
- ❖ **AMMUNITION** - try to use the best ammunition that you can afford.
- ❖ **RIFLE SCOPE MOUNTED ON TOP OF THE RIFLE.** Magnification typically ranges from 24x to 40x power– more on that later
- ❖ **RESTS** (Front and rear) To support the rifle on the Benchrest Table – more to follow.
- ❖ **BENCHREST STOOL** The Shooter uses it to sit at the “bench”. While some may be available at the club, plan to get your own – adjustable to precisely your height, and suited to your comfort.



## Some more on the Equipment

**Rests.** Front.... ( typically a 3 legged metal rest with a “bag” arrangement on top to support the stock). May have multiple adjustment options for elevation (broad and fine) and windage adjustments. Some models also have fine adjustment on all legs to set the rest perfectly level - as does the model shown below which also has a bubble level. Also available in basic form without all the fancy adjustment features. Its purpose is to hold the stock steady while you get ready, sight and then complete the shot.



Rear.... (a “sandbag” with ears to support the Butt). Rear rests can come in a variety of heights with different height “ears” and varying gap sizes between the ears. Good quality ones have a solid firm base, usually made from leather. Fine sand is often used as a filler.

## RIFLESCOPE

Rifle Scopes are mounted on the Rifle with scope mounts. Features to note :

TRA competitions shoot as close as 20m. Make sure the scope focuses down to 20m or you will be looking through a blurry milk bottle, finding it very hard to shoot or sitting out of the competition!

TRA competitions also shoot out to 90m, so you will need absolute minimum power of 25x magnification to define bullet holes in sunlight. Ideally go for 32x, 36x or even up to 40x magnification. Some scopes will have a magnification ring to vary the magnification, which often means more moving parts making them usually more expensive than a fixed power scope.

Parallax adjustment. This means close focussing adjustment from 20m to infinity. Some scopes do not list their minimum parallax for good reason – look for a better scope!

Clarity of optics in the glass. Good optical glass is paramount in clear vision to define bullet holes as close as 20m. You get what you pay for. Buy right once and save long term.

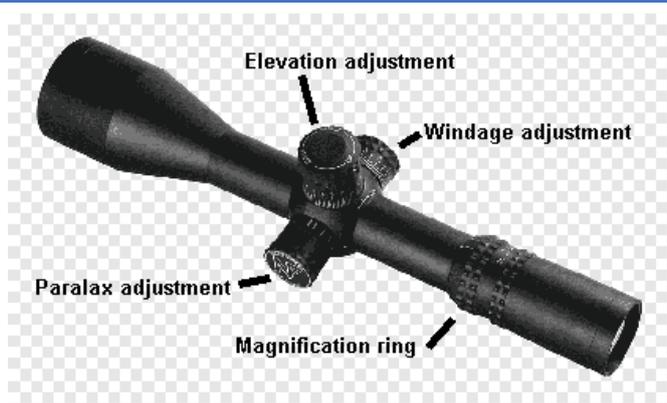
Try to ignore most of the confusing MOA clutter lines and angles, illuminated reticules and other flashy offerings that some scope manufacturers bring out. Select a scope with a simple cross hair and a single dot.

Scopes can have different adjustment values represented as minutes of angle (MOA). However, check with your coach, or another experienced shooter for precise help on this.

Sight adjustment on most scopes is clockwise adjustment will move the point of impact up/down or left/right as appropriate.

Elevation and Windage sight adjustment.

Typically in the form of two dials (larger dials are more efficient for target shooting), one on top of the Scope for elevation adjustment and one on the side for windage adjustment.



Parallax Adjustment. The most often incorrectly set rifle scope adjustment of all .... is the parallax setting. This is NOT a focus adjustment or a range finder. This adjustment allows your scope to adjust the optics, so that the crosshairs will be correctly positioned when shooting at different distances. This is accomplished by adjusting the front lens (or in some scopes a side turret or dial) to remove the parallax, making sure the image focuses on the same plane as the crosshairs.

The way to set this adjustment is seldom to just dial the correct distance printed on the scope.

This adjustment usually needs to be set more accurately (with the rifle securely positioned on a bench) so that you can look through the scope.

The purpose of the parallax adjustment is to eliminate this unwanted optical error that makes your crosshairs appear to "move". Do not touch or move the rifle/scope when checking for parallax.

A lot of scopes have a fixed parallax setting that is exactly correct for shooting at only "one" specific distance. If your scope has a parallax adjustment it can be perfectly adjusted for shooting at any distance, so that your crosshairs will appear to be rock solid, no matter where your eye is positioned.

This is very important when the "exact" position of your eye is not always concentric with your scope. The **slightest** variance can make a huge difference. (courtesy of Innovative Technologies) Test this out to see the difference!

Installing a Rifle scope the first time. The correct way is to select some solid scope mounts which are high enough to ensure the scope doesn't come into contact with the barrel and are the right diameter for your scope. These will usually be an option when purchasing the scope.

Install the bottom half of the mounts onto the receiver or dovetail. Lay the scope on the mounts then position the top half of the mounts over the scope onto the bottom half. Lightly and evenly tighten the nuts attaching the top/bottom halves of the mounts ensuring you do not over tighten.

**BEST IDEA – ASK FOR HELP FROM SOMEONE WHO KNOWS!**

## TECHNIQUE

Place the Rests (front and rear) on the table so that a comfortable position can be adopted while you are seated at the table with the head behind the Scope and the rifle aimed at the target.

Adjust the rests and rest settings such that the rifle is aiming directly at the target. Ensure the front rest is secure on the table. If necessary use spacers under the rear rest (anti slip matting is a useful accessory here).



Adjust crosshair focus and distance setting, ensuring no parallax error is present

Photos left and below show a basic bench-rest setup.



Again – before you buy anything, have a good look around at what others are using and take your cue from them.

## sighting

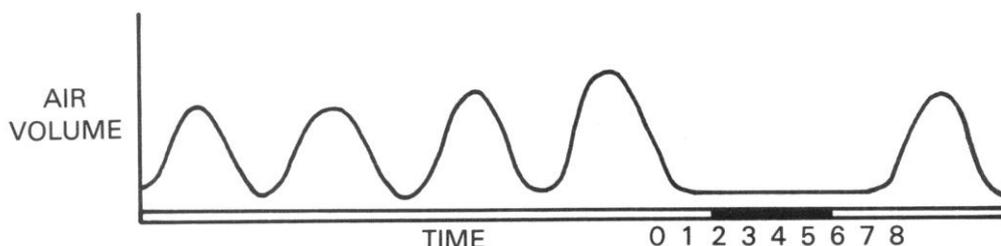
First – realise that perfect sight is not required!! Many of the world's best shooters wear glasses.

A few simple hints:

1. Keep both eyes open (less fatigue on the eyes)
2. Use a blinker (a simple headband and a strip of card or translucent milk bottle) if you want to cut out the sight in the non-aiming eye.
3. Look as straight forward as possible – adopt a good head position for this element.
4. Keep hydrated – your eyes will appreciate this.
5. Wearing glasses while shooting is not a problem – there are even special frames for shooting.

# breathing

Correct breathing is essential for living and just as important in shooting. Oxygen is needed for **MUSCLE CONTROL, STEADINESS & CLEAR SIGHTING**.



Breathe normally until the rifle starts to settle

1. cease the breath at the natural end of the exhale
2. hold that pause for only 4-6 seconds and release the shot or try the whole cycle again

# TRIGGER

There are two basic types of triggers:



**SINGLE STAGE** – where one finger movement releases the shot.

**TWO-STAGE** – where there is a first lighter movement, and the second heavier movement to release the shot.

**SENSITIVITY** of feel is required for the light-weight trigger of a smallbore target rifle, and the first pad of the index finger is usually used.

When the rifle settles, pressure is applied to the trigger and the shot is released.

Over time, the Trigger release will become a semi-automatic response to a steady hold and good sight picture.

Check the rifle manual for details on precise trigger adjustment, or see a more experienced coach. Random fiddling on a two stage trigger can have rather dire consequences.

**WHAT TRIGGER WEIGHT IS RIGHT???** Trigger weight must be set so that the shooter has **COMPLETE** control of the trigger. A trigger that is too light may result in shots being fired well before you are ready. Newer shooters will work better with triggers that are a little heavier (until you gain that fine motor control).

Many rifle triggers are set at around 100-140 grams for the more experienced shooter. Around 180-200gm is perfect for the less experienced shooter – it allows more control. Yes there are ways to determine the weight of the trigger – ask your coach!

# what's next

## So..... you want to improve?

**KEEP A DIARY** – (simple exercise book will do) make notes on.....

- ❖ the goals for each training session or competition
- ❖ what was done to produce the good shots
- ❖ how you felt when you shot well and not so well
- ❖ what have you learned about the competition or training session
- ❖ any changes made to your position or technique

Record details of .... the range, the time of the match or training, the weather conditions, the scores and equipment settings.

## So..... you want to improve even more?

- ❖ Use the best equipment and ammunition that you can afford. Try to use the same club rifle every week or plan to purchase a rifle that is best adapted to suit you.
- ❖ When you have your own equipment, train and practice as much as possible .. and use dry firing. That is "firing" without a bullet in the breech – this helps to confirm good practice.
- ❖ Take part in as many competitions as possible.
- ❖ Have many shooting discussions over coffee, with the coach
- ❖ Listen to other shooters, get a "feel" for improvement
- ❖ Experiment to perfect the positions and technique – BUT – change only one thing at a time, then test, analyse and discuss the results with the coach.
- ❖ Big one ....ensure that you HAVE FUN

## THE LITTLE DETAILS....

Target shooting can be enjoyed by everyone, regardless of age or gender. It is.....

- ❖ a good family activity
- ❖ an enjoyable recreation
- ❖ a serious competitive sport

## WHAT IS THE ULTIMATE?

Australian teams are selected for world competition, and the State Team matches at the TRA Nationals are always hotly contested.

## Are you ready to join the success and be the next champion??

# getting physical

Good health and physical fitness are essential for the degree of control needed in shooting.



The recipe for success includes

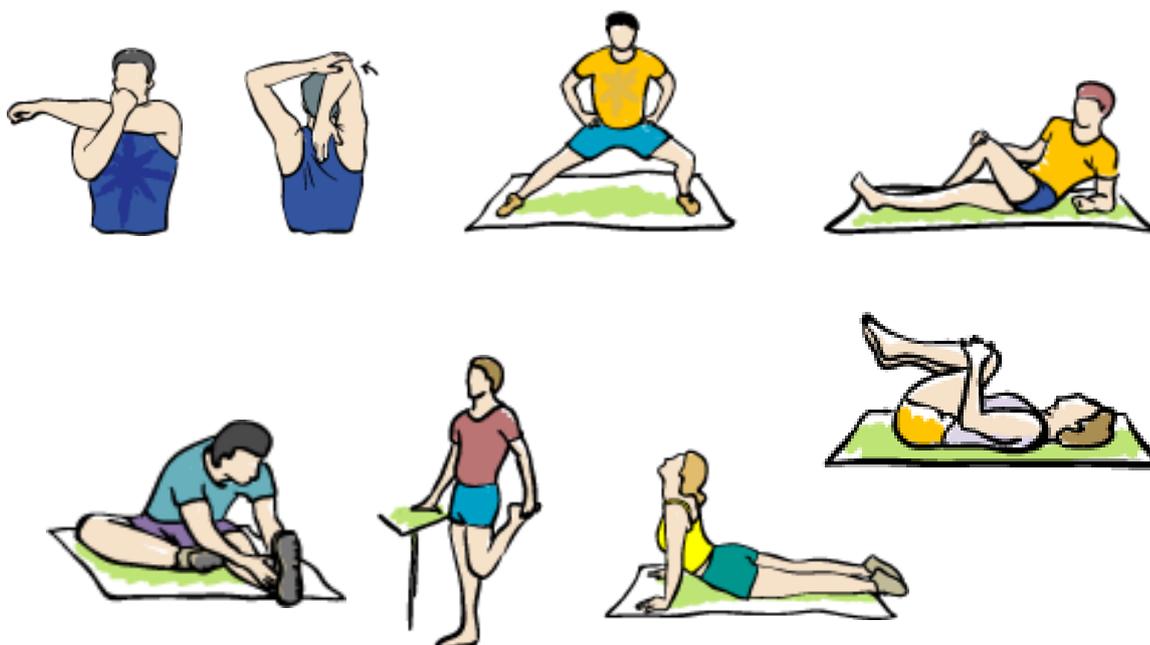
- ❖ a balanced diet
- ❖ general fitness training
- ❖ adequate rest
- ❖ avoidance of drugs, including nicotine & alcohol
- ❖ shooting-specific fitness training

This provides the basis for an effective training program which should include provisions for physical conditioning, technique training, mental conditioning and a gradual build-up to specific goals.

Performance enhancing drugs of any type are not permitted in shooting – this is especially with respect to the “Beta-blocker” type of drugs. Remember to advise your coach if you are on any medication. Some drugs are banned and testing is done at the elite level.

Stretching is essential for the shooter, and stretches such as those shown here should be completed before every shooting session.

Warm muscles perform better and there is less chance of injury or fatigue. Swimming and walking are two fantastic exercise elements that will enhance shooting progress and performance.

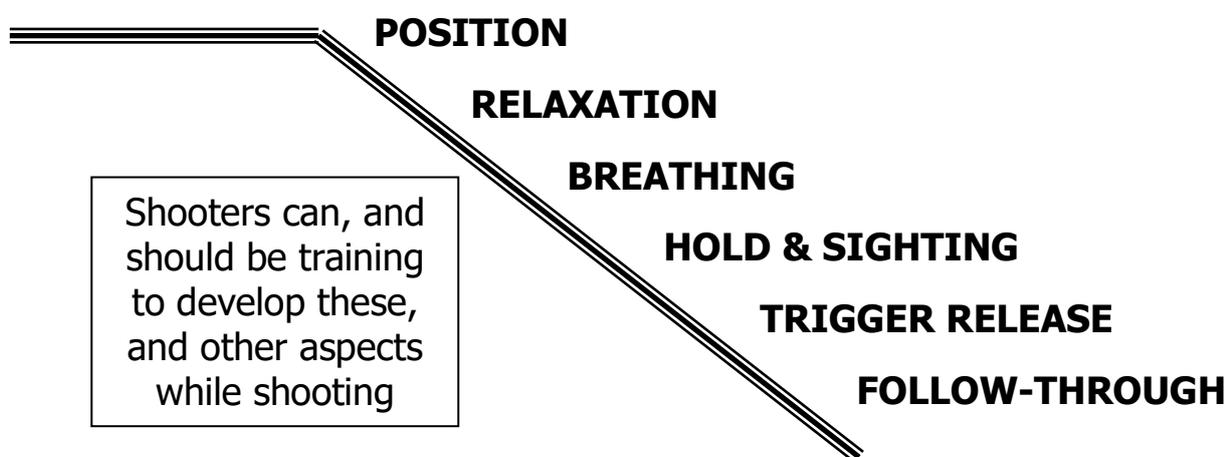


# it's all in the mind

Once the basic shooting techniques have been mastered, the factor of mental control assumes more importance. How you think about your shooting, and yourself is crucial to success.

At the highest level, about 90% of the shooter's attention and effort is directed towards this area.

Once a shooter is capable of completing one "good" shot, then the challenge is to repeat the performance for as many times as required in the match. To achieve this, the shooter must have mastered the elements of technique and be **PARTICULAR** about



*Dual Olympian and Australian Champion, Robyn Ridley is shown shooting an air rifle in the standing position.*

The control required of a shooter is a combination of

- DETERMINATION**
- CONFIDENCE**
- MENTAL REHEARSAL**
- ATTENTION TO DETAIL / FOCUS**
- CONCENTRATION ON PERFORMANCE**

Whether shooting with an air rifle at 10m or with a smallbore rifle, shooting 20m, 50m or 90m – benchrest rifle shooting is indeed a fun and challenging sport.

Self discipline skills and imagination (visualisation) are a few of the mental tools of the shooter who wishes to succeed. As a developing shooter, ask more experienced coaches and shooters to share their expertise on this area, or investigate on the internet. There are many sites and opinions available.

## The Clothing

Just like the footballer, who wears a club jumper and the correct coloured socks when going out to play a game, or the hockey player who also puts on the club shirt and socks, the benchrest rifle shooter should set aside certain items as the “shooting gear”

- Same stable shoes – ensures that your feet stay flat on the ground and aids position stability
- Same shirt – you want to have a “similar feel” when you lean into the rifle. Nothing too tight, nor too loose, or too bulky. It’s a challenge, but worth it.
- If you want to wear a cap, do it all the time when shooting, not just when you remember.
- Have the “shooting pants” set aside – those pants that are comfortable, and again not too tight, not too loose and not too bulky.

# champion's checklist

Champions have **DESIRE** - the will to work and chase improvement. They pursue excellence.

Champions assess their **POTENTIAL** for greatness – they know themselves, their strengths (and how to capitalise on them) and their weaknesses.

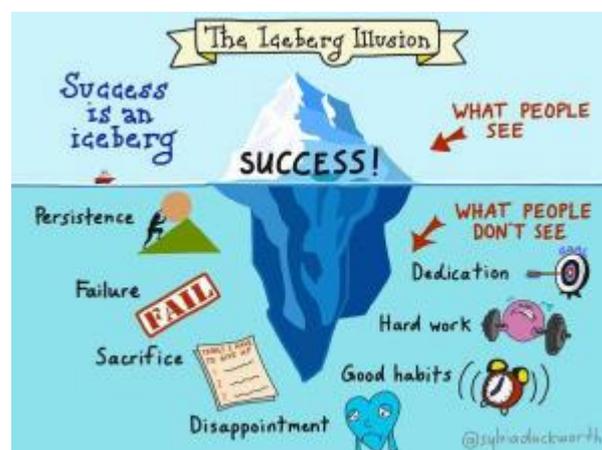
Champions establish **GOALS**, they make them challenging to achieve yet attainable.

Champions have **DEDICATION** and **DETERMINATION**. They know what they are willing to sacrifice to attain the goals they have set themselves.

Champions have **PRIDE** in themselves.

**CONFIDENCE** comes with pride, and confidence implies that you have mastered your task and dispelled doubt and anxiety.

Champions have (or develop) a **WILLINGNESS** to **WORK** tirelessly – they never give up, and they take care of all the “little things”



# FIREARMS SAFETY & RANGE ETIQUETTE

## The Sport of Shooting.

**Shooting is a sport that is popular all over the world.** Perhaps you have already realised the reasons why this is so.

***Shooting is a special skill sport*** – every sport tests different sport powers ..... Shooting tests co-ordination, endurance and how precisely a special skill can be performed, time and time again.

***Shooting is a participation sport with many rewards.*** There is a special thrill about hitting a target that one can barely see! It is fun to watch your scores get better over time.

***Shooting is a safe and lifetime sport.*** Many sports are more restrictive to the older competitor or more accident prone for the younger. Shooting has a safety record of which many other sports would be most proud.

***Shooting is non gender specific.*** Men and women compete equally in most competitions within Australia. Skill and persistence over strength.

***Shooting is exciting.*** Every shot that is fired is the result of your hard work and the results exhibit the thrill of the chase.

## TO KEEP THE SPORT THIS GOOD, WE ALL NEED...

**COURTESY** – being polite to our fellow club members and visitors.

**SHOOTING COURTESY** – ensure that your actions do not disturb the person next to you, especially while they are still shooting.

**OBEDIENCE** – the Range Officer is there to ensure that the sport is kept safe. Listen and obey their instructions at all times.

**TO CLEAN UP** – remember to collect your brass shells and bin them

**BECOME INVOLVED** – ask what you can do to help on the range and at the club. Working towards becoming an Official or Coach.

**CLEANLINESS** – there are no staff coming behind you after you shoot, so pick up your bits and pieces, and especially any rubbish

# Safety is no accident

Always remember.....

- ❖ OBEY THE INSTRUCTIONS of the RANGE OFFICER at all times
- ❖ Only load the rifle under the instruction of the Range Officer
- ❖ Keep your FINGER AWAY FROM THE TRIGGER until you are aiming at the target
- ❖ Leave the BREECH OPEN (with a Breech Flag in) when you are not shooting.
- ❖ The rifle MUST BE POINTED AT THE TARGET BEFORE THE BOLT IS FULLY CLOSED
- ❖ When you have finished shooting, check that the breech of the rifle is empty, and your breech flag is inserted. The Range staff will also check the rifle.
- ❖ Alcohol or drugs, and shooting do not mix at all on a rifle range.
- ❖ Talk to your Club Captain and refer to your local State Firearms Laws for further information on Firearms Licenses and storage requirements

## On the Range.....

### *Range Officer Commands*

Whenever you shoot, the range will be under the direction of a Range Officer. This person/s is charged with ensuring the safe conduct of the training or competition and the welfare of all shooters.

At your first Open Shoot or Prize Shoot, you will hear specific commands. These are the standard commands that will be given, and they may be more "official" than those used at the club. It is never too early to know these terms. Our sport depends upon safety.

<b>Given commands</b>	<b>What that means</b>
<i>The range is now live</i>	That means that you can bring the rifle forward and place it on your bench with the other bits you need, as the Range Officer has confirmed that there is no one forward of the firing line.
<i>Check your targets</i>	The Range Officer is reminding you to check that you know what target number you will shoot on, and that you are set up to shoot only on that target. You may also be asked to check that there are no visual obstructions between you and your target.... ie flags
<i>Unlimited sighters</i>	This means that you can shoot as many sighting shots as you wish on your sighting diagrams. However, once you have started your competition shots, you cannot return to sighting shots, unless directed to by the Range Officer. It is also wise to check whether the competition requires 1, 2 or 5 shots per aiming mark.
<b>START</b>	Means that you can commence to shoot your sighters and then competition shots

<i>Preparation &amp; Sighting time START</i>	This is a <u>competition command</u> that indicates that you have 15 minutes to get your equipment onto the firing point, check your flags / target, and you can commence <u>sighting shots</u> to help you get into your correct shooting position and be on target.
<i>10 minutes</i>	That means that there is 10 minutes to go for you to complete your shooting. Remember, no shot on the target = no score.
<i>Cease Fire</i>	<b>You must stop shooting immediately.</b> The Match has ended or the Range Officer has noticed a dangerous situation that requires an immediate cease fire. Open your bolt and insert your breech flag. Do not question this – do it.

## Targets.....paper

**50m, 20m, 90m** – In many local competitions, shooters will be asked to put an entry number on the target, not a name. The scorers match the entry number with the correct name during the results entry process. State competitions will often have identifying labels on the target.

**50m Targets.....electronic.** All information will be entered via computer before you start to shoot. Check that your name is correctly listed on the screen....then concentrate on your shooting.

## Score Check Procedure – paper or electronic targets

All shooters have the right to ask the scorers to check their score of a match or card. This is done by going to the scoring room, and speaking to a representative of the classification office who will in turn, action your request, often after the completion of the appropriate request form.

Any score checks should be completed prior to the expiry of the "protest time" (which will be advised on the score sheet). After the protest time has expired, then the printed scores stand as correct, and the scorers can do no more. It is a shooter's responsibility to be aware of the realistic potential score. It is always a good idea to speak with a more experienced shooter until you get the feel for visual scoring on paper targets.

## Advice when buying your first rifle

### When considering second-hand equipment, look for...

- The group example that came with the rifle when it was new
- A rifle that will fit your needs – now and in the future
- A rifle has minimal damage to the stock or the barrel
- The history of the rifle – who has owned it since new, if possible
- What accessories are being sold with the rifle
- What extras you will need to purchase

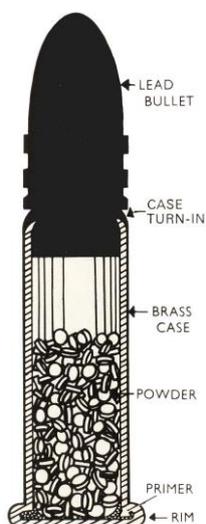
### When considering new equipment...

- Ask experienced shooters about the equipment they are using
- Look at all the available information on the internet about the brands and models you are considering.
- Ask for your coach's opinion on your preferred choice
- Investigate the possibility of having a "test hold" of the rifle of your choice – either through the firearms dealer or another experienced shooter with the same model firearm.
- Unlike cars, rifles hold their value at a far steadier rate, and a rifle purchase is an investment

**Prior to making any purchase, you will need to conform fully with the local Firearms Legislation. Check with the Police Dept for appropriate details. A gun safe will need to be installed in your home or place of storage, and you will need to apply for a Firearms Licence. Take advice from your Club or State officials and learn from their experience.**

## ADDITIONAL TECHNICAL INFORMATION

### The Bullet

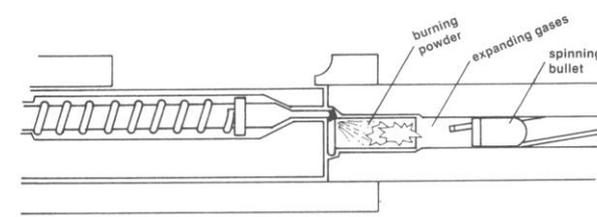
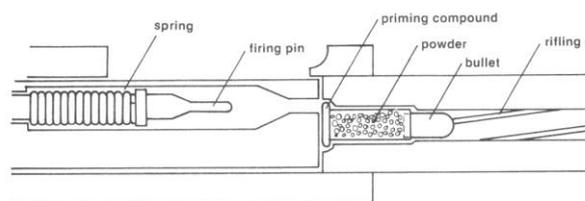


**It is appropriate to firstly look at the precise composition of the bullets used in the smallbore or .22 rimfire rifle.**

As the name suggests, this is a rimfire projectile – that is, the bullet is fired as a result of the firing pin making sharp contact with the rim of the casing, and setting off the primer

### Firing a shot

Before learning how to maintain a rifle, it is advisable to know how the process of “firing a bullet” is technically achieved.



The firing pin and firing spring are the key elements. The pin is released by the trigger which in turn hits the edge of the bullet casing ... this sets off the chain reaction within the priming compound and powder... expanding gases force the lead bullet to commence its journey down the barrel – turning through the “rifled” barrel, and the lead bullet is on its way to the target. “Rifled” means that there are twists inside the barrel.

Both the pin and spring should be kept in good order with a little cleaning and oil every now and then. More on cleaning in the next section.

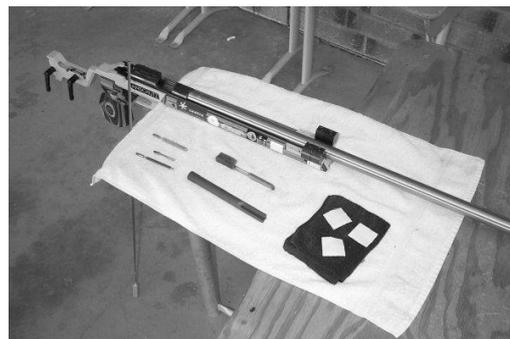
### Cleaning a smallbore rifle

The rifle is a precision instrument and should be maintained. The stock requires little care, save for the cleaning of fingerprints and a little mild polish on the stock every now and then.

The outside of the barrel should also be kept “fingerprint free”. Those living in the more humid areas need to protect the barrel from moisture. As a good rule, all rifles housed in cases with foam interiors, should be wrapped in a sheath of cotton or toweling type material to absorb any excess moisture.

## Cleaning the Barrel – a few simple rules

- Set up all that you will need within easy reach
- Remove the bolt and scope prior to the barrel cleaning
- Always use a rod guide when using a cleaning rod
- Clean only from the breech end of the rifle
- A toothbrush is a very valuable tool for softly cleaning those harder to get to places



- See your coach or more experienced shooters for advice
- Ask for a demonstration on appropriate cleaning procedures.
- Cleaning – run a cloth patch through the barrel. Change the patch and repeat the process until the patch runs through clean.

**Why use the rod guide????** To ensure that the rod travels smoothly through the barrel and nothing can possibly enter the trigger mechanism area.

**How often to clean????** The answer to this question has been, and will be debated often... Some will confirm after every match or training session the rifle should be cleaned, while others will happily leave their rifles for months between cleans. The best view is somewhere in between!!

- Use the toothbrush to remove any build-up dirt or grime on the bolt head. Once the bolt is clean and ready to back into the rifle – wipe off any finger prints.
- No poking sharp metal objects into or near the bolt – the toothbrush or a toothpick will complete all the required tasks.



Ask your coach or other experienced shooters for full instruction and a demonstration on how to dismantle, clean and reassemble the bolt.

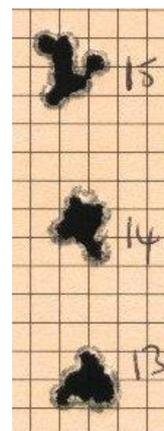
- Protect the metal surface of the barrel from rust by wiping with a cloth dampened in good gun oil.
- Check that all screws that should be tight, are in fact tight.
- Ask your coach or another experienced shooter to confirm that your bedding screws (the ones that hold the barrel into the stock) are tensioned correctly.

## Ammunition

There are many excellent brands of ammunition available for your use. Ask the opinion of other experienced shooters, and see what is available in your club or local firearm's store.

Remember you should also batch test the ammunition – that means, shoot some test groups on a calm day, to see what size groups the ammunition will produce in YOUR barrel.

The size of the groups will change with different barrels, so resist just buying what champion "Joe" is using – it may not work as well in you barrel. Test and try. Test and try. The diagram on the right shows three different batches of ammunition fired through the same barrel.



## Storing rifles (air or .22)

If you know that there is to be a break from shooting for a while, then it is important that the rifle is "laid to rest" correctly and safely. Clean the rifle and barrel thoroughly, then leave a light film of oil in the barrel prior to storing in a dry area.

The bolt should be out of the rifle and stored in a clean sealed container.

**Remember to thoroughly clean the barrel prior to re-using.**

## What's next?

In this internet age, it seems that everyone wants to create a video clip about the right way to do anything! You are encouraged to watch whatever you can, however please speak to your coach, or another experienced shooter before you try something have seen on YouTube.

**Now it's time to stop reading and get shooting!**