

Grand Valley State University Shooting Team



Guide for Members



Compiled by: Cameron Zwart, President

Revised 3/29/07

<http://www2.gvsu.edu/~grrpc/Welcome.html>

INTRODUCTION:

The purpose of the Grand Valley Shooting Team is to provide all Grand Valley students with the opportunity to enjoy rifle sports and shooting during the school year. Students with all level of skill are able to have a safe and enjoyable time at the shooting range interacting with other students and shooting. Some of the main focuses of the team are teaching and promoting firearm safety and developing shooting skills. The team participates in monthly postal matches as well as several weekend matches during the school year in the Western Intercollegiate Rifle Conference (WIRC), an eleven-college rifle league. Being a member of the WIRC allows shooters to participate and compete in three position small-bore (.22 long rifle) and air rifle (.177 pellet). Experience is not needed and all equipment, including rifles, is provided. Practice is held at the Grand Rapids Rifle & Pistol Club (1331 Nagel SW, Wyoming), an indoor range with a state of the art air circulation system to keep the air fresh while shooting as well year round climate control. New members are always welcome. However, you must be enrolled at GVSU during the current semester to join the team.

FUNDING/DUES:

The GVSU Shooting Team is a Student Life Club. A majority of the Team's funding comes from the GVSU Student Life Department. Dues are also collected each semester and are \$___ for one practice day a week and \$___ for two practice days a week. A third source of income is through fundraising. Members decide fundraising techniques throughout the year.

Upon paying dues a member is entitled to use of the range during practice hours, ammunition, targets, equipment, and rifle use. Their league entry fee is also paid to the Western Intercollegiate Rifle Conference (WIRC). There is no additional out of pocket expenses for postal matches.

Out of pocket costs arise when there is a match that requires travel. There are several matches during each semester that require travel, such as the Boilermaker and the Finals Match. Personal equipment upgrades are also paid out of pocket to the shooter.

There are currently no scholarships available for the Shooting Team.

Upon paying dues new members must sign the Campus Life 'Sports Release' form. This form must be signed yearly.

OFFICERS:

The Shooting Team is entirely run by students with the assistance of a faculty adviser and a coach. There are four officer positions: President, Vice President, Treasurer, and Secretary. Individuals are elected to positions yearly. Officers are elected in spring semester and are installed during the following fall semester. All officers are provided with the opportunity to be a leader and it is a great way to develop leadership skills.

Officers for the 2006-2007 school year are:

President:	Cameron Zwart	cameroncody49426@aol.com
Vice President:	George Lovequist	Boston_George@comcast.net
Treasurer:	R. Ryan Phillips	phillirr@student.gvsu.edu
Secretary:	Spencer Flavin	sflavin2@yahoo.com
Advisor:	Brian Johnson	johnsonb@gvsu.edu
Coach:	April Chernoby	chernoba@student.gvsu.edu

PRACTICE:

Practices are held Tuesdays 4-7 and Thursdays 6-9 at the Grand Rapids Rifle and Pistol Club. Practice is encouraged but not mandatory. You must sign in prior to setting up on the ready line.

THE RANGE:

Located at 1331 Nagel Avenue SW in Wyoming, Michigan, the Grand Rapids Rifle and Pistol Club has been the home of the Grand Valley State University Shooting Team since its inception in 1996. The range is indoors and features twelve 50ft-shooting lanes. Each shooting point has its own personal bench for use. Air remains fresh, clean, and temperature appropriate year round through a state of the art air purification system. In the lobby of the building there is ample room for interaction and relaxation. There also are several storage compartments dedicated for exclusive use by the Grand Valley Shooting Team. These exist to allow students to keep their equipment and/or rifle at the range when they are not using them.

More information on the Grand Rapids Rifle and Pistol Club can be found at www.grrpc.org

THE WIRC:

The WIRC is composed of eleven schools located in the Midwest. Schools compete in monthly postal matches and an end of the year Finals Match. Some schools are Varsity programs while others are Club programs.

Member schools include:

University of Akron, Morehead State, Grand Valley State, Rose Hulman Institute of Technology, Ohio State University, Univ. of Missouri-Kansas City, University of Michigan, Purdue University, Michigan State University, and University of Wisconsin Oshkosh.

COMPETITION FORMAT:

Three-position smallbore is shot in the prone, standing, and kneeling positions. Four-position smallbore is shot in prone, standing, kneeling, and sitting. Air rifle is shot in standing only. Indoor smallbore is shot at a distance of 50 feet and outdoor is shot at 50 yards. Air rifle is only shot indoors at 10 meters. A three-position half course smallbore match is 60 shots, a full course is 120 shots, and a four-position match is 40 shots. Air rifle is also 40 shots. In a half course match, 20 minutes is allocated for prone, 40 minutes for standing, and 30 minutes for kneeling. All times are doubled in a full course match.

MATCHES:

GVSU VS. PURDUE SHOOTOUT:

The GVSU vs. Purdue Shootout is shot every September at GRR&PC as the first match of the year. This is a smallbore only match. The number of shooters determines the course of fire. Historically this has been a great rivalry. GVSU has been prevalent since 2004.

THE BOILERMAKER INVITATIONAL:

The Boilermaker Invitational is shot every October at Purdue University in West Lafayette, Indiana. Both smallbore and air rifle are shot. The number of shooters determines the course of fire. Approximately ten teams participate each year.

WIRC POSTAL MATCHES:

All the teams in the WIRC shoot postal matches monthly (October-January) at their home range. The course of fire is half course. The targets, once shot, are mailed to an unbiased scorer who records the scores. All members of the team are allowed to participate in the matches individually. Four predetermined members of each team represent the school and their scores are totaled together separately from everyone else's. Individual and team scores are then ranked and results are distributed to the member schools.

WIRC FINALS MATCH:

The WIRC Finals Match is shot every February. It is similar to the postal matches except that all teams shoot on site, shoulder to shoulder. It is shot in half course format.

NRA NATIONAL MATCHES:

The NRA National Outdoor Rifle and Pistol Championships are held at Camp Perry in Port Clinton, Ohio. Each summer the nation's finest civilian and military marksmen and women square off for five weeks of rifle and pistol competition in a variety of formats and events. The National Matches are considered America's "World Series of the Shooting Sports", and have been a tradition since 1907.

THE SAINT JOSEPH VALLEY LEAGUE:

The St. Joseph Valley League is comprised of rifle clubs from Michigan, Indiana, and Illinois. Each team is allowed to have as many shooters shoot as they wish. However, only the top four scores in each position count towards the final team score.

The format for the league is 4 positions, indoors, and rifles may have any type of sights.

There are 15 regular season matches and a Finals Match. The regular season matches are duel matches shot on sight. The Finals match is shot on sight with all member teams competing. The St. Joseph Valley League is not college specific, but rather open to all shooters.

OTHER MATCHES:

There is a variety of other local, state, and national matches shot through out the year as well.

EQUIPMENT:

AMMUNITION BLOCK:

An ammunition block is used by a shooter to hold ammunition while shooting.

BLINDER:

For shooters, it is important to keep both eyes open. The closing of the non-aiming eye affects the aiming eye and leads to fatigue in the eyes. For that reason a blinder is a necessary accessory for shooting. A blinder protects against light and glare. Many shooters feel they help avoid distractions and aid in concentration.

BOOTS:

Shooting boots provide extra support in the standing and kneeling positions. A good shooting boot will give ankle support as well. If shooting boots are unavailable, a hard sole shoe or boot will suffice.

EYE PROTECTION:

Safety glasses are designed to prevent foreign matter from entering your eyes. They are usually inexpensive and should be worn any time there is an opportunity for something to accidentally enter your eye.

GLOVE:

A shooting glove helps to cushion the hand from the stock and sling, shield the rifle from your pulse, and provide a non-slip surface for traction. It should be comfortable without extra bulk. A shooting glove should be loose fitting and not pinch the hand. If it does pinch the hand, it will have an effect on your shooting over the length of a match. The 5-finger shooting glove is far and away the most popular worldwide.

HEADBAND/HAT

Shooters should wear a shooting cap or headband when shooting. Both help avoid distractions that can take points off your score.

Special shooting caps have a longer bill than regular caps and side flaps that extend down from the bill. This helps shooters maintain concentration by concealing possible distractions and keeping sunlight and glare from their eyes.

The headband keeps sweat and hair from getting in the shooter's eyes, and some shooters use it to hold a blinder over the non-aiming eye.

HEARING PROTECTION:

Your hearing is very important to you. The noise from smallbore rifles can damage your hearing, especially over a long period of time. Whenever you are shooting or observing, always wear hearing protection.

Some recommend using both the "throw away" earplugs and earmuffs for greater noise reduction. Both the plugs and muffs must be worn properly for maximum protection. The muffs are only as effective as the seal they make with the head. Shooting glasses, especially ones with thick frames, break this seal and hold the muff slightly away from the head, as can sweatbands.

It is critical to a shooter's performance that noise and distractions be kept to a minimum. Hearing protection will help do this. Therefore, it may be beneficial to wear hearing protection when shooting air guns even though noise levels are not dangerous.

JACKET/PANTS:

Shooting jackets and pants provide extra support for the shooter. They help reduce the effect of pulse on the rifle while providing as much support as possible.

Shooting jackets traditionally have been made of leather for durability although some shooters prefer the stiffer canvas jackets. They have a hook on the left sleeve (right-handed shooters) to attach to the sling and keep it from slipping.

Shooting pants have traditionally been made of canvas although leather pants are available.

KNEELING ROLL:

A good kneeling roll will give the shooter proper support and allow for a comfortable, steady position in kneeling. The kneeling roll must conform to the shooter's instep. A kneeling roll can be stuffed with several different materials. The material you choose must allow the roll to be flexible enough to fit your instep but not too flexible as to compromise support.

MAT:

A shooting mat will help keep you dry and make your firing point more comfortable when shooting prone. A mat provides non-slip surfaces for your elbows to give you a more stable position.

PALM REST:

The palm rest is used for moving the rifle stock up to the level of the head. Some shooters can accomplish this without the use of a palm rest. They simply support the rifle with the hand. Others use a small block of wood. A most important point is that the correct positioning of the body is assumed, and then the rifle is fitted to the body, not the body to the rifle. The palm rest is positioned in the heel of the hand, and the wrist is reviewed for its correctness of position and shooting athlete comfort.

SCORING GAUGE:

Targets require scoring and scoring devices. A scoring gauge is a metal device the same size as the shot hole, used to score targets. Variations include the "inward plug" and "outward plug." With the inward plug, the score is determined by the contact point of the outside edge of the plug with the inside of the next lowest scoring ring. With an outward plug, the score is determined by the contact point of the outer edge of the plug with the inside of the scoring ring. An outward scoring gauge is the most accurate tool to use to score a paper target. Unfortunately, it is only usable on certain targets and each gauge must be designed for that target. It is the most accurate gauge because it measures against a scoring ring that has not been disturbed by a bullet hole. The key is to look at the shot and decide what you are looking for. You can tell immediately if the shot is a close nine or a wide seven. If it is a close shot, put the outward gauge in the hole and look at the outward edge. With an outward scoring gauge, if the gauge is tangent to the outer edge of the scoring ring or closer to the center, the shooter gets the higher value. You will not see any white when the plug is truly tangent to the scoring ring.

SLING:

The purpose of the shooting sling is to support the weight of the rifle. The differences in slings are the cost and convenience to the shooter. A sling cannot be used in standing.

SHOOTING STAND/OFF HAND STAND:

The shooting stand is used to rest the rifle between shots when shooting in the standing position. By resting the rifle on the stand between standing shots, shooters can rest their muscles and not tire as quickly. By placing the stand close by, shooters use the least exertion possible to pick up the rifle for each shot. The stand also positions the ammo in the most convenient location for standing. The shooting stand consists of telescoping tubes that can be collapsed. At a short height, the stand is perfect to hold ammunition for kneeling. This means that shooters can complete a match with minimal movement in their position between shots, which allows for greater consistency.

SPOTTING SCOPE:

The spotting scope is used to locate your shots on the target for sighting purposes and to evaluate your shooting performance. When shooting outdoors it can help in determining wind direction by allowing you to observe mirage. If you shoot primarily outdoors, where lighting varies with weather conditions, distances are 50 yards or more and greater clarity is required to see mirage, you will want to consider a scope with a fairly large objective lens (either 82mm or 60mm). If you shoot mostly indoors, where distances are 50 and 75 feet, a 50mm objective lens scope will be adequate.

Most shooters prefer the offset or angled spotting scopes because those scopes do not require the shooters to move from their position as much as a straight scope does.

SPOTTING SCOPE STAND:

A scope stand that is adjustable for height is essential for all shooting positions, including prone. A properly located spotting scope will allow shooters to spot their shots without moving their positions.

AMMUNITION:

SMALLBORE:

There is a great deal of difference between match ammunition and ordinary .22s bought at a local discount store. Match ammo is designed for one specific purpose--to deliver the best accuracy under match conditions. Ordinary .22 ammo is designed for a multitude of purposes such as functioning in different types of actions, ease of manufacturing and low cost. A target shooter attempting to train with ordinary ammo may find the initial cash savings to be counter-productive to progress and definitely not cost effective in the long run. Ammo that is not accurate enough to deliver the shot the shooter fired does not allow the shooter to properly evaluate performance and can destroy confidence in their ability to call shots. Shooters will progress faster with fewer shots of better ammunition.

Members of GVSU Shooting Team are provided with SK Standard .22 caliber long rifle, rimfire ammunition.

AIR RIFLE:

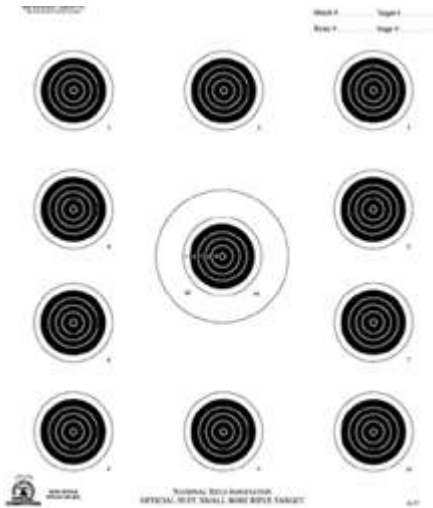
Pellets are now only available in bulk packed in tins. The shooter both must inspect pellets from tins visually and by feel to avoid pellets with imperfections. The pellets that aren't perfect must be discarded. For best results in competition, you should open a fresh container immediately prior to your relay. Pellets oxidize from exposure to the atmosphere, and as a result accuracy will deteriorate. It is important to reseal pellet containers after opening.

Members of GVSU Shooting Team are provided with RWS Meisterkugeln .177 caliber pellets.

TARGETS:

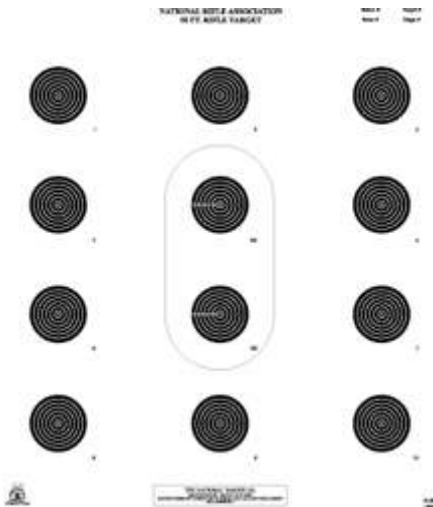
A-17:

The A-17 target is used in indoor four-position smallbore. This is the target used in the Saint Joseph Valley League.



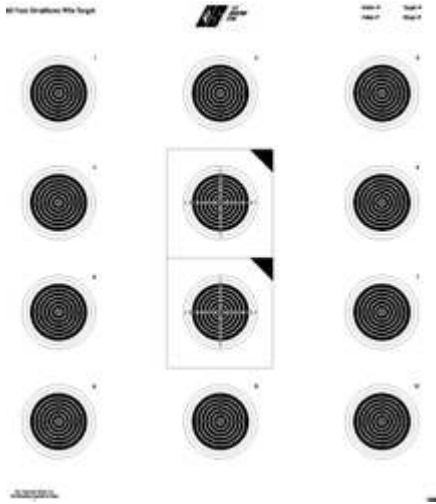
A-36:

The A-36 target is used in indoor three position. This is the target formerly used in the WIRC.



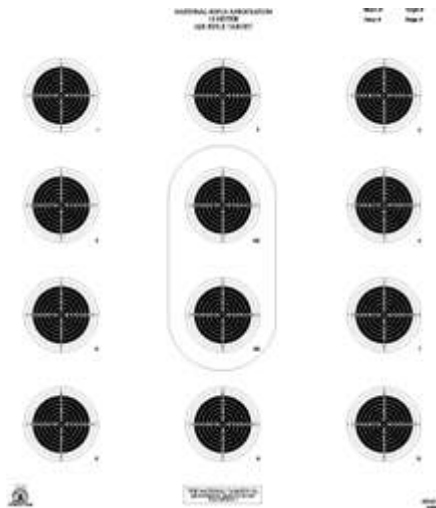
USA/NRA 50:

The USA/NRA target is used in college indoor three position and is the official target of USA Shooting. This is the primary smallbore target used by the GVSU Shooting Team.



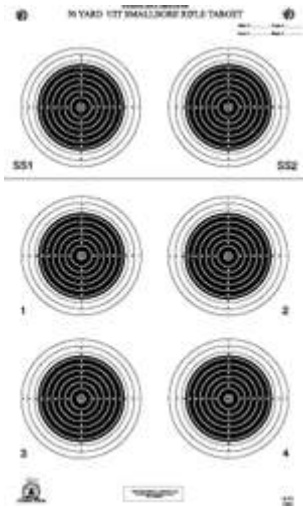
AR 5/10:

The AR 5-10 target is used for air rifle. This is the air rifle target used by the GVSU Shooting Team.



A-51:

The A-51 target is used in outdoor three position.



SMALLBORE RIFLES:

A majority of the rifles used by the GVSU Shooting Team are made available through a partnership with the Grand Rapids Rifle and Pistol Club. However, many members do own and use their own rifles. All rifles are single shot, bolt-action rifles with aperture sights. Iron sights or metallic sights are the only sights allowed in the WIRC. A hand stop is used in prone, kneeling, and sitting. A palm rest is used in standing.

Typical rifles used include those made by Anschuetz, Feinwerkbau, along with a few models from Remington, Winchester, Mossberg, and others. Prices vary considerably, from \$200-300 on up to the \$4000 range.

Telescopic sights are allowed for Any Sight matches, but you might be surprised how accurate good metallic sights are. If you can't shoot a good score with iron sights you probably won't be able to do so with a scope either. The scope may help with sight alignment, but it can't help with trigger control and a good hold.

AIR RIFLES:

The GVSU Shooting Team owns five Walther LG300XT aluminum stock air rifles. Several members also own their own rifles. Most air rifles, including the rifles owned by the Shooting Team function through the use of compressed air, although some function through the use of a spring. Competition air rifles must have metallic or aperture sights. A hand stop or a palm rest cannot be used in air rifle. Slings also may not be used in air rifle.

SIGHTS:

Target aperture sights are designed for maximum precision, and the rear sight is usually a large disk (up to 1 inch or 2.5 cm in diameter) with a small hole in the middle, and placed close to the shooter's eye. The front sight may be a simple bead or post, but is more often a *globe* type sight, which consists of a cylinder with a threaded cap, which allows a number of differently shaped front sights to be used. Most common are posts of varying widths and heights or rings of varying diameter — these can be chosen by the shooter for the best fit to the target being used. Tinted transparent plastic inserts may also be used, with a hole in the middle; these work the same way as an opaque ring, but provide a less obstructed view of the target. Even for the maximum precision, there should still be a significant area of white visible around the bullseye and between the front and rear sight ring (if a front ring is being used). Since the best key to determining center is the amount of light passing through the apertures, a narrow, dim ring of light can actually be more difficult to work with than a larger, brighter ring. The precise sizes are quite subjective, and depend on both shooter preference and ambient lighting, which is why target rifles come with easily replaceable front sight inserts, and adjustable rear apertures.

By turning the elevation dial on the rear sight clockwise the point of impact is lowered. By turning the elevation dial counterclockwise the point of impact is raised. A clockwise turn of the windage dial will move the point of impact to the left. A counterclockwise turn of the windage dial will move the point of impact to the right.

PRONE POSITION:

PREPERATION:

The prone position is thought to be the easiest position of the three. Placing the mat on the firing position or point starts the prone position, the mat is placed at an angle facing or pointing 10-20 degrees to the right of the target. The upper left corner of the mat will then be pointing to the target center. Place the spotting scope between the firing line and the left shoulder position while in firing and position. This will allow the athlete to view the target while charging the rifle. Place the ammo block to the right of the firing position between the right shoulder and hips at a comfortable position. All other items required by the athlete can be placed to the right of the shooting position but not in such a manner as to disrupt the athlete next to you. Do not place items of equipment on or forward of the firing line during live fire or competitions.

TAKING THE POSITION:

The body is in contact with the ground, and the low center of gravity of the body produces a very stable position. A major amount of patience and concentration will be required before observable results and consistent scores are achieved. The prone position is not hard to develop, however, care must be taken as to the placement of the mass of weight. For this position, the majority of the weight must be found on the left side for right-handed shooters and on the right for left handed shooters. The placement of the weight mass on the left or right side will take pressure off the stomach and chest areas. On the side away from the weight mass, the right side becomes an outrigger so to speak and will be used for stabilizing the overall position during the shooting technique. By placing the weight mass on

the left or right side the heart will not impart a heartbeat to the position during the firing sequences.

BODY:

The body stretched out at an angle of about 5 to 10 degrees alignment direction of the right of the target and the right knee is slightly bent. If the shoulders, backbone, and hips are awkwardly positioned, cramps will occur or muscles will be overly stressed causing a snap release upon the firing of the rifle, and resulting in flipping the rifle off the sighted target bull. The backbone or spine and the shoulders must be at right angles. The body weight lies on the left side of the body. This makes breathing easier and prevents the pulse transmission from the abdominal area to the bone structure. By drawing the right leg up, the body is turned toward the left side, freeing the chest and stomach from the ground. This makes it unnecessary for the body to raise and lower during the breathing cycle. Basically, the body weight is on the left side, and the aorta, the main artery from the heart, is moved from the spine so internal pulse beat is not transmitted directly to the bony portions of the body. This results in less movement of the body and the rifle. If the knee is brought up too far (90 degrees), too much pressure will be placed on the left elbow.

LEGS:

The legs should spread loosely and without tension. The left leg will be straight but the right leg will be bent and drawn up 35 degree in order to ease the pressure on the stomach and stabilize the position. The inside of the right knee is placed upon or against the mat. The right leg is drawn up and both feet are pointed toward the right. The shooter lies to the left of the line of fire with the body forming a 5 to 15 degree angle from the line of fire. The body is not twisted, but is stretched out and relaxed; the spine is straight.

FEET:

The position of the feet is determined by the position of the body. The left foot must turn inward with the outside of the foot resting on the floor or mat. The right foot should rest with the instep pressing lightly against the floor. It is immaterial whether the heel is on the ground,

LEFT ARM:

The weight of the rifle is supported by the left forearm, which is placed directly below and slightly to the left of the rifle. The left elbow is pushed forward, giving a flat, extended, and therefore stable body position. The angle of the forearm must not be less than 30 degrees. The central load bearing point is below and slightly to its left of the rifle. This produces a well-balanced, triangular position in a natural and relaxed position. However, if the full left elbow is forced directly below the rifle, excess tension will occur in the upper arm and shoulder. Any changes in the elbow position during shooting will mean changes in the point of impact have occurred. The athlete will find that the elbow will move during the shooting process and will destroy the sighting process and cause the position to become unstable during the shooting procedure. The left elbow is not directly under the rifle. It is slightly to the left of the rifle. When viewed from above, the left leg, left side, shoulder, elbow and wrist, all appear to be a straight line. The Prone position requires the left forearm to angle at not less than 30 degrees from sling hand stop and continuing to a point on the floor where the elbow make contact with the floor

LEFT HAND:

The front of the rifle stock rest on the ball of the thumb of the left hand. The fingers are completely relaxed and should not grip the weapon. Even the smallest irregular pressure from the fingers on the stock or barrel can produce a change in the point of impact. The left hand is pushed forward as far as the rifle hand stop. This means the stock is securely held and will not slip during the shooting process. In both prone and kneeling positions, the left hand is pushed against the hand stop. The fingers must never grip the fore stock. If hand is placed too far forward the arm muscles will be called upon to support the rifle while in an extended posture. This will induce fatigue and pain. If the hand is too far to the rear, the shoulders and chest will be raised with an uneven weight on the elbows. The rifle must be supported by the bone structure and sling. In actual fact the rifle is totally supported by the sling. The rifle is placed across the heel of the hand and the base of the thumb ball, to take advantage of and originate bone-to-bone support.

RIFLE SLING:

Without a sling the left arm supports 92% of the weight of the rifle. Without additional sling support, and despite the support provided by the forearm, the rifle could only be maintained in the firing position by sheer muscular strength. The rifle sling forms a stable triangle as it joins the left arm, the forearm and the stock, thereby imparting the required degree of stability to the shooting position. When putting on the sling, the athlete must make sure the pulse effect from the upper arm is not transmitted through the sling to the rifle. The athlete will fit the sling loop above the upper arm muscle. For the sling to fit properly above the upper arm muscle, the athlete must wear a proper fitting-shooting jacket with a suitable sling-retaining loop. The supporting effect makes the position stable and the sling will ease

the muscle fatigue while supporting the rifle and position. It also ensures the head is upright increasing the stability of the position and sighting system. If the rifle sling slips lower on the arm during competition, it may press on a main artery and the pulse will be transmitted through the sling to the rifle. Upon the sling slipping, the sling assumes the lower sling position and this arrangement reduces the angle of the position, often becoming close in and violating the rule of 30-degree angle of the left arm in the prone position. The shooter who tries to make up for the increase in stability with renewed muscular effort, which is just bad shooting procedure. The length of the athlete's arms will determine the point on front of the stock at which the rifle sling and hand stop will be located and attached. The hand stop must not be allowed to move during shooting or competition. The sling passes around the left forearm. This means there is no transfer of pulse effect to the upper arm and the tension is exerted directly backwards rather than to the side. The sling length is adjusted in such a way the rifle is held securely and effortlessly in the firing position. If the sling is too long, the firing position will be too low and too limp. If it is too short, it will press the shoulder backwards and affect the circulation of blood. This will result in an increased pulse and pain in the left hand, arm, and shoulder.

RIGHT SHOULDER:

A few athletes neglect the importance of the rifle and right shoulder position relationship. This is wrong, as any variations of location or of pressure on the butt, plate will inevitably result in changes in the point of impact. As described above, the ideal position is the shoulder placed at right angles to the spine. The rifle butt must be positioned at the same point each and every shot as its relationship to the shoulder is in fact the fulcrum of the rifle in relation to muzzle jump or other recoil movements.

RIGHT ARM:

The elbow is slightly to one side and the position is flat and stable. The shoulder is behind the weapon. The right elbow is relaxed and pushed forward, but slightly to the right in a comfortable position. The actual distance from the body is determined by the position of the body. The athlete will not allow the arm to move back towards the body; otherwise, the shoulder will be at an unnatural angle and will be cramped.

RIGHT HAND:

The right hand must not exert lateral pressure on the rifle stock. The degree of firmness used will depend upon the manner of firing, the trigger resistance the individual firing technique. If trigger pull resistance is high, the athlete will grip the rifle firmly and if the trigger pull resistance is low, the athlete will grip the rifle lightly. Always use identical pressure during competition. The wrist is extended as a natural extension of the forearm; the trigger finger must not be in contact with the rifle stock. The thumb must not be uncomfortable or obstruct the shooting sequences. In order to obtain good shoulder contact, the right elbow may be drawn in a little. However, if this is done, the position must be completely steady and well balanced. It is wrong for the arm to be drawn in for balancing the shooting position. The right hand must grasp the rifle stock grip in such a manner that the movements of the trigger finger is directly to the rear. A key point here is that the two inner fingers are firmly pulled against the grip in order to lock the wrist during the firing sequence. The locking of the wrist will firm the right hand and arm system. A good way to test and learn this function is to shake hands with a friend and pulling firmly with the two inner fingers, the athlete will note the wrist will firm or lock solid depending upon the

pressure applied. While this is normally used in pistol shooting, it equally applies to the rifle athlete as well.

HEAD POSITION:

The head position is obtained quite naturally if the position is correctly adopted. The height and inclination of the rifle stock must match the head position in such a way that the athlete can see through the middle of the rear sight and the head maintains it straight up and down balance without difficulty. If necessary, a slight misalignment of the rifle (canted) may have to be accepted. The position of the cheek and its pressure on the rifle stock must be constant from each one-shot match to the next.

EYE RELIEF:

The distance of the eye from the rear sight is generally somewhere between two to six inches. However, whatever the distance is for a given athlete, the distance must always be the same for each one-shot match thereafter. Eye relief of necessity change from position to position. In the Prone, a relatively short eye relief will be used; in kneeling and standing a relatively longer eye relief is used. Eye relief distance is a function of the spot weld referred to in other chapters. Eye relief of a given position is determined by the precise location of the spot weld upon the rifle stock.

LENGTH OF STOCK:

It has been stated the spine and shoulder must be at right angle to each other and is used to determine the stock length. Mainly the body dimensions of the athlete and mounting of the rifle sling on the front of the rifle stock determine it. The length of the stock is important, if too short the shoulder has to be pushed forward by muscular effort in order to make a good

contact with the rifle. If the stock is too long, the shoulder is pushed back into an unnatural position causing a cramped position that is out of balance. Each shooting position requires a different stock length and in free rifle, this is not much of a problem, however, if the competition is in standard rifle prone only, the stock must be fitted for that shooting position.

BEHAVIOR OF WEAPON DURING SHOOTING:

In a steady relaxed position, the muzzle of the rifle will jump a fraction with the shot and then return immediately to its original position if quality competition cartridges are used. If this happens after every match shot, the shooting position can be regarded as the perfect shooting position and is well balanced.

SLING:

Attach sling to rifle forehand stop. Twist the sling one-half turn to the left. Slip the sling onto the arm and place it at the joining of the triceps and deltoid muscles. The sling will then pass over the top of the biceps muscle. Insure the sling is tightened preventing slippage but not so tight as to cause pulse beat being transmitted through the sling. Adjust sling length until it supports the rifle completely.

STANDING POSITION:

PREPERATION:

Place the spotting scope between the firing line and the right shoulder position while in firing position. This will allow the athlete to view the target while charging the rifle. Place the ammo block to the offhand stand and to the right of the firing position between the right shoulder and hips at a comfortable position. All other items required by the athlete can be placed to the left of the shooting position but not in such a manner as to disrupt the athlete next to your position.

TAKING THE POSITION:

It is said this is the most difficult of all the shooting positions. Because of a very small floor area and a very high center of gravity, both the body and the rifle are subjected to considerable movement. The standing position requires a highly perfected firing technique, a properly balanced body, perfect rifle positioning, and unconscious mental control over the neuromuscular systems. The standing athlete must be able to use the unconscious mind to stabilize the standing position. Above all the standing position must be balanced and serenely quiet with bone-to-bone contact. The position or body has a natural sway in its attempt to become stable. It is never without movement or perfectly quiet. However, it is possible for the athlete to stop body sway during $\frac{3}{4}$ of a second period.

BUILDING THE POSITION:

The standing position will be established in the following manner: Feet pointing to the right of a reference line commencing from the target to the firing point. The upper body turning to the right about 85 degrees of the target line and the rifle firing across the athletes chest and pointing approximately 2 to 5 degrees away from the chest. The degrees specified

are dependent upon the structure or build of the shooting athlete. Rifle and rifle stock forward of the pistol grip may not rest against the chest. Care is taken to keep the trigger hand away from the body during the firing sequence.

BODY POSITION:

The shooter leans the body slightly (1 to 3 degrees) backwards and to the right, in order to balance the weight of the rifle if necessary. The athlete does not have to lean backwards as long as the even distribution of weight on the legs is accomplished with the purpose of ensuring a balanced stance. In many cases, an upright position with just a slight counter balancing is all that is necessary for stabilizing the position. The feet will only be the width of the shooter shoulders. Not wider than the shoulders. Bone-to-bone structure is required in the construction of the position and during the firing sequence; the lungs exhaust all air from the lungs until a balance is achieved. During this lung balance phase, the spine is compressed to finalize the body shooting structure. For building a stable position, a shooting athlete faces approximately 85 degrees to the right or left of the target firing line. And, the athlete should stand on the firmest surface possible and not on a shooting mat or springy surface. Upon the bend and twist is properly maintained, the weight of the rifle will be resting on the chest through the arm structure. When the lungs are balanced, (lungs being emptied or exhausted) the spine will compress the full length and add additional stability to the overall position. The work required by the muscles in the standing position is to maintain the body in a standing posture, and to assist eliminating position sway as controlled by the autonomic systems. Note that when the lungs again inhale, the shooting position will again commence sway because the spine will decompress.

HIPS:

As the body is leaning slightly backward, the hip must not be thrust forward, or serving as a support for the left elbow. The last statement is always held as a truth, but in actual practice, the hip is never used in support of the left elbow. The left elbow in fact makes contact with the rib cage and rest on not less than three of the ribs. The amount by which the body is moved backwards will depend on the build of the athlete. An athletic person (wide shoulders, medium hips) will move further back for example than a person with very slim hips will. The hips are always level and never moved or thrust forward. The hips face at 85 degrees, concurrently with the body.

The most important aspect is that the lower body (legs, hips, and hips) forms the central balance of the standing position. Without the central balance achieved by correct foot placement and the upper body mass positioned directly over the hips, The standing position will become unbalanced and will waver as the autonomic system attempts to achieve renewed balance of the total body. The body balancing procedure is automatic and can be activated automatically by the autonomic system. Even during the shooting procedure and technique. The shooting athlete can preclude or prevent this movement by meticulous and precision construction of the shooting position with the use of the mental shooting technique.

SPINE:

The spine generally holds the body torso together and forms a support structure for the torso. Within the athletic position, the athlete will find increased stability by compressing the spine during the optimum firing time. The spine is compressed by exhausting the lungs to achieve lung balance and of course, the spine will again expand upon the inhaling of new air into the lungs. Excessive twist or back bending for achieving balance will cause the

shooting athlete trouble in that the athletes endurance will be shortened during the stress and strain of the excessive twist and muscle restriction.

LEFT ARM:

The left arm is tucked forward firmly against the left ribs and directly below the rifle. This means the weight of the rifle is supported by the bone structure of the left arm and is not supported by muscular effort. It is very important for a stable stance with the rifle, that the muscles of the left hand and left arm are completely relaxed, and the rifle rest on the thumb ball joint. The left arm forms a pedestal in support of the bone rifle system. The rifle is further stabilized by firmly holding the rifle stock between the pistol grip and butt assembly against the chest and shoulder or hook under the arm. The left leg supports equally with the right leg, the total weight of the left arm and rifle. The upper and lower parts of the leg are straight and the knee is in a normal position. This position must not be forced, otherwise the stable bone-to-bone structure from forearm to the foot will be broken, and the position will become unstable. The knees will be subject to considerable stress if they are flexed. Note: The total position is poorly constructed if the spine is not compressed upon its self through the balancing of the lungs.

FOOT POSITIONING:

The feet will be in normal position with the feet not wider than the athlete's shoulders. A wider foot position will produce stress and is unstable for the athlete. The feet moved closer together would increase body vibrations and make it difficult to correct the overall balance. The athlete moves the weight mass forward on the balls of the feet in this manner and yet allows some of the weight to remain on the heels in the position. The weight distribution should be 60% on the front of the foot and 40 % on the heel portion of the foot. The shooter

should wear footwear with flat soles to heel as they are firmer soles and will provide some foot/ankle support and comply with ISSF regulations or rules. The body mass of weight will be placed on the footpad area just behind the toe joints. This means that the weight is slightly forward on the foot but not on the toes. The toes will not feel pressure of weight or balance. Sixty percent of the body weight is positioned on the ball of the foot and the remaining forty percent on the athlete's heel.

ANKLES:

The ankles are the most vulnerable part of the standing position. For this reason, they must be supported by suitable footwear. Leather uppers of the shoes must support the foot and restrict the amount of movement of the ankle. The weight is distributed evenly on both legs. The ankles are the most overlooked portions of the standing position in that the athlete seldom uses shoes that will support the athlete's ankle and the position. Placing the body and shooting position in perfect balance can eliminate tension in the ankles. In a perfect balance position the ankles muscles may remain relaxed during the construction and use of the shooting position.

POSITIONING OF THE HEAD:

The body's balance is detected by the ears (hammer and anvil transducer). This means that the head must be erect for body balance maintenance. The balance as we know it is not the balance required by a competitive athlete. The competitive balance required by the athlete is controlled by the unconscious mind and last $\frac{1}{2}$ to $\frac{3}{4}$ of a second. The athlete must time the shot to occur in a two second or less one-shot match in each match shooting position during a competition.

THE PALM REST:

The palm rest is used for moving the rifle stock up to the level of the head. Some shooters can accomplish this without the use of a palm rest. They simply support the rifle with the hand. Others use a small block of wood. A most important point is that the correct positioning of the body is assumed, and then the rifle is fitted to the body, not the body to the rifle. The palm rest is positioned in the heel of the hand, and the wrist is reviewed for its correctness of position and shooting athlete comfort.

RIGHT SHOULDER:

The standing shooting position, the shoulders must be relaxed and at right angles to the spine including parallel to a line between the target to firing point. The spine must be compressed in order to achieve bone-to-bone contact and stabilize the standing position. This requires compression of the spine when the lungs have expelled the air to a point when the lungs become balanced and failing in its attempt to inhale or exhale.

RIGHT ARM:

The standing position, a good shoulder or upper arm contact is important. However, it is not always easy when the shoulders are almost parallel to the rifle stock for the hook assembly to be held securely under the arm or against the biceps and rib cage. The only solution is for the right arm to be slightly raised allowing physical contact and achieving rifle control during the optimum firing period in standard rifle and the arm down when using the hook under the arm. This resistance is necessary in order to reduce or eliminate rearward movement of the rifle during trigger pull or the breaking of the shot.

RIGHT HAND:

The right hand holds the rifle stock securely from one-shot match to the next one-shot match. The fingers must remain in their natural, curved position all the time. If the finger muscles are flexed, a 'hook' is formed. The grip is firm, as the outstretched muscles of the open hand do not tire as easily as in the clenched hand. Furthermore, when the hand is clenched, the muscles of the lower arm are flexed and must be avoided at all costs. The 'hook' formed by the fingers holding the handgrip of the stock, and depending on the type of rifle, pull the rifle stock firmly into the shoulder or upper arm using the middle two fingers of the right hand. The thumb lies loosely against the stock. As in the kneeling and prone positions, the wrist is extended in a natural position. The right index finger should not press against the stock. The slight movements caused by the trigger pull could easily be transmitted to the stock thereby causing lateral movements. This could cause or result in complete misses.

LEFT HAND:

The success of the entire position depends principally on the position of the left hand. It is the left hand that determines the steadiness of the rifle position, final height of the position and final stance of the athlete. There are many different possible combinations of hand and finger positions.

KNEELING POSITION:

PREPERATION:

Commence the kneeling position by placing the mat on the firing position or point, the mat is placed at an angle facing or pointing 10 to 20 degrees to the right of the target. The upper left corner of the mat will then be pointing to the target center. Place the spotting scope between the firing line and the left shoulder position while in firing position. This will allow the athlete to view the target while charging the rifle. Place the ammo block to the right of the firing position between the right shoulder and hips at a comfortable position within easy reach. All other items required by the athlete can be placed to the right of the shooting position but not in such a manner as to disrupt the athlete next to your position.

TAKING THE POSITION:

The shooter takes the position pointing 20 to 30 degrees to the right of the target line. The rifle is balanced as in other positions just at the front of the trigger guard. If the hook or butt plate must be extended the necessary movement of the counter weights must also be accomplished. Many discussions have occurred over the years as to which is placed first, the left foot or right foot with kneeling roll. Upon making the turn to the right, the shooter places the left foot at the firing line. Once the left foot is placed the athlete will take position with the right foot and the kneeling roll. The right knee is placed at a 20-30 degree angle to the right and from the left foot. For more information about the left knee, please continue. (If the right knee is place to close to the left foot, the position will become unbalanced. Such an unbalanced will cause random results because the natural point of aim is moving randomly around the bull. The left knee and leg will also be pointing at the bull down range. The balance of position and rifle fall into two differing lines of balance. The rifle balance starts

at a central balance point located at the front trigger guard and continues on a direct line through the left elbow and left knee to a point just forward of the left heel of the left foot. The position point of balance starts at a point of the neck and shoulders, continuing on a direct line to the floor just in front of the right foot and kneeling roll. The rifle balance line is a Sub-balance line of the main position balance line. It may seem strange that the position line should end in front of the kneeling roll. The reason is that the torso is leaning forward so the line will also be at an angle.

SPINE:

The spine is slightly inclined forwards, so the full weight of the body rests exactly on the three-point position “left foot - right knee - right foot” and is balanced evenly. The shoulders hang loosely and relaxed in their relationship to the backbone/spine, forming, as in the prone position, the shoulders at right angles to the spine/backbone and rifle. If the spine and shoulders are not at right angles to one another during the position construction and shooting, considerable lateral instability will have to be expected. The backbone/spine must be relaxed and yet not hunched. It should be slightly bent without the muscles having to be flexed. This is important, as the stability of the shooting position is dependent upon the athlete’s construction of the perfect shooting position and receiving the perfect bull’s-eye. The Quiet Zone appears as the lungs approach perfect balance, air neither inhale or exhale. The rifle is perfectly sighted, lungs are in perfect balance, the Quiet Zone arrives, trigger is pulled straight to the rear, validate the shooting process and the perfect bull’s-eye. The shooter will note that upon the lungs reaching balance the spine will compress and thereby stiffing the position.

LEFT FOOT:

The left foot must be directly below the rifle and at an angle of 5 to 8 degrees to the right of target. While in position the leg and foot are in line with the knee, the elbow position upon the knee. In this way, the position of the leg is at its most stable. Here, as in standing, the kneeling position requires a good pair of flat sole and ankle supporting shoes to wear during shooting.

LEFT LEG:

The left leg must be vertical, or depending upon the body size, inclined slightly forwards below the rifle. No sideways or lateral movement of the leg is permitted. Again, a line is formed with the foot, knee, and elbow in line with the balance point of the rifle.

RIGHT FOOT:

The right foot must be straight, or with the heel slightly turned outward, and resting on the tip. A kneeling roll supports the instep, the toe presses firmly on the ground and the heel presses directly onto the bone of the right buttock (bone-to-bone support). The sole of the shoe must be firm, as it is only in this way that the body is supported at the ground point of contact, and the weight of the body has three effective and stable supporting points. As with the left foot, a pair of shooting boots must be worn to reinforce the shooting position.

KNEELING ROLL:

Kneeling rolls must be secure. They must not change during the competition, as this can affect the entire stability of the position. While the length of the roll does not influence the position, the diameter is very important. If the roll is too thick, it is subject to the entire body weight and additionally the sole by itself does not give the required support. If the roll is too thick, the sighting, if the body position is correct, will be below the target, and if the roll is

too thin, the sight will be above the target. The position or body weight is placed upon the sole heel and not on the ankle. The even weight distribution on three supporting points. If the filling is too thick, the left foot will be subjected to stress and will give to impression of falling forward in the position. It can be seen from the three examples that the fit of the roll is very important. The correct diameter can be worked out from the length of the limbs and the shoe size of the athletes.

RIGHT LEG:

The position of the right leg in relation to the left leg should form an angle of about 30 to 40 degrees. This angle may be difficult for some athletes and it can be reduced. If the angle of 40 degrees is exceeded, excessive weight is transferred to the front and onto the left leg. Each shooter must experiment and find out which is the ideal angle for the athlete.

BUTTOCKS:

As already indicated the bone-to-bone of the right buttock should rest on the heel of the right shoe. This makes a stable connection between the bone structure and the ground through the foot.

LEFT ARM:

The left elbow is placed in the hollow between the kneecap and the femur. The left forearm rest on the extension of the femur. The weight of the rifle is therefore transmitted directly to a stable base, the thigh while continuing through the knee and onward to the foot.

LEFT HAND:

The rifle stock rests on the ball of the thumb. The fingers are completely relaxed and do not touch the stock. All flexing of the hand muscles is to be avoided, as it can affect the

steadiness of the position. The sling length and the position requirements determine the position of the left hand under the stock.

RIGHT ARM/SHOULDER:

It is the right arm, and thereby the right hand, that has the ultimate responsibility for firing and for ensuring a proper shoulder contact. The shoulder contact must be made without muscles being flexed. The necessary pressure on shoulder is brought about by the weight of a completely relaxed right arm; the right hand holds securely onto the stock pistol grip with two middle fingers. The majority of the mistakes occur in the kneeling position because the shoulder is too high or the shoulders are not at right angles with the rifle and generally result in a cramped position. The reason for this is to be found in shoulder position adjustment during the construction of the shooting position. The rifle butt or butt hook (if used) is placed into the shoulder pocket of the right or left shoulder. Care must be taken in Big-bore that the rifle butt is not located on or in contact with the collarbone going to the neck. The Butt-hook is placed in such a way that the hook lies next to the ribcage and not tightly under the armpit.

RIGHT HAND:

The thumb of the right hand, without pressure being applied, rests on the rifle stock. The index finger is on the trigger, has no contact with the stock. The rifle is only drawn into the shoulder by the middle two fingers. The right wrist is extended and acts as a direct extension of the lower arm. The hand grasps the grip of the stock and the trigger finger pulls directly backwards. As in the other positions, the two inner fingers are pulled against the grip to firm the wrist during the firing sequence. Lastly, the trigger hand and arm is in a straight line,

which includes the wrist. The thumb and index finger forms an L with the trigger finger parallel with the rifle stock and ready to engage the trigger.

WEIGHT DISTRIBUTION OF BODY:

The weight of the body and the rifle is distributed evenly between the three bearing points left foot, right knee, right foot tip or instep with roll. Because of the space between these points, the main weight lies within and at the rear of the triangle. In this way, the position has maximum stability. Normally, a cant is not required if the position is correctly established and the stock is correctly sized to the shooting athlete. Because of the nature of the kneeling position rifle orientation occurs naturally, however, if the sight does not fall on the target bull naturally, the whole shooting position must be reconstructed. A straight line from the right shoulder or upper right arm through the left hand, left elbow and left knee to the target.

SLING:

Place the sling in the high sling position on the upper left arm. Attach the sling to the rifle allowing adequate length for a proper sling fit. Tighten the sling until the rifle is supported totally by the sling without the use of arm muscle tension. Move the forehead stop against the left hand and secure the forehead stop-locking nut to the rifle stock rail. Check the natural point of aim and make any adjustments necessary. Shooting across the position is caused by sling that is too tight and incorrect position setup. The ideal shooting direction is across yet out of the chest position. The athlete will fine the distance from shoulder to rifle is about 5 to 8 inches. The shooting athlete must shoot out of the position not across the position.

SIGHT ALIGNMENT:

You want to have your body aligned in such a way that the rifle naturally points at the target, this is known as natural point of aim. You should not be using your muscles to force the rifle into position. A good way to check for proper alignment is to shift your body and hand position slightly to line the target up in the sight, then closing your eye for a few seconds. When you open your eye, the target should still be in the sight. If it is not, you need to adjust the position a little more.

BREATH CONTROL:

You should be taking deep relaxed breaths when setting up. You should not be holding your breath, or hyperventilating. When you are ready to pull the trigger, your final exhale should be slow and even.

TRIGGER SQUEEZE:

Depending on the rifle, you may have a single stage or two-stage trigger. For single stage triggers, just before firing, you will have squeezed the trigger to roughly 3/4 of it's travel. You will have to get to know how your trigger feels. When you fire, gently squeeze the rest of the way. Do not jerk the trigger, for this can compromise your hold.

FOLLOW THROUGH:

The bullet will take a finite amount of time to travel the length of the barrel once you squeeze the trigger. During that interval of time, you want to make sure that the barrel stays pointed at the target. To ensure this, you should get into the habit of keeping your eyes open, looking at the target. Don't anticipate the noise or recoil; a .22 has relatively little of either.

DRY FIRING:

Dry firing means the release of the cocked trigger mechanism without the release of a projectile. Dry firing is an excellent means of reinforcing the good technical execution of a shot without fear of getting distracted. By concentrating on all of the technical aspects a shooter can more fully appreciate subtle differences he would not necessarily notice during live fire. Above all else, shooters are not distracted by bullet holes in scoring rings that lead to an unhealthy preoccupation with scores. When dry firing is performed correctly it takes on an extremely satisfying quality.

Dry firing is part of a process where you mentally reinforce good technique. If your technique sucks when you first start, work on it until it improves. Focus on the positives. Cancel out the bad shots, revel in the good shots. There is no pressure to perform, no cruel bullet holes, just a clean slate to chalk up pluses and erase the minuses.

SAFETY:The fundamental rules for firearm safety are: always keep the gun pointed in a safe direction, always keep your finger off the trigger until ready to shoot, and always keep the gun unloaded until ready to use. Also, remember never walk down range unless a range officer has told you it is safe to do so.

Other important firearm and shooting rules are:

Know your target and what is beyond.

Know how to use the gun safely.

Be sure the gun is safe to operate.

Use only the correct ammunition for your gun.

Wear eye and ear protection as appropriate.

Never use alcohol or over-the-counter, prescription or other drugs before or while shooting.

Store guns so they are not accessible to unauthorized persons.

Be aware that certain types of guns and many shooting activities require additional safety precautions.

SMALLBORE CLEANING:

Cleaning frequency varies from gun to gun. There are rifles that require cleaning between stages in a match to maintain peak accuracy and others can go several hundred rounds before accuracy drops off. Your experience with your barrel should dictate your cleaning schedule. It is recommended that you should clean you barrel prior to a match. Proper cleaning of a target rifle will have a very positive effect on the accuracy and life of the rifle. Some of the rules to follow are: always clean from the breech; always use a cleaning rod guide; always use a one-piece steel-cleaning rod. Remember, more rifles are damaged by improper cleaning, than by actual use. It's far better to do just a minimal job of lubricating a rifle to prevent rust or other damage than to damage it by over zealous cleaning. You should expect to have to shoot 10 to 20 shots from a clean gun before it settles down to normal performance.

A step-by-step procedure on how to clean a competition smallbore rifle can be found at:

<http://nealjguns.com/pdfcatalog/Smlclean.pdf>

AIR RIFLE CLEANING:

1. Put the gun in a cradle or vise. You can hold it on a table or on your lap, but it is much easier if it is held for you.

2. Open the breech.

3. Feed a “pull through” from the breech to the muzzle.

A “Pull Through” is nothing more than a piece of monofilament fishing leader doubled and tied into a large loop that is longer than your barrel by enough to leave a small loop at each end.

4. Tie a piece of string that is longer than the barrel to the loop of the “pull through” on the breech end and to the trigger guard.

5. Use 7/8 to 1-1/4 inch cotton patches.

6. Use a solvent that is non-petroleum based.

7. Put a rag across the gun under the breech to keep excess solvent out of the action.

8. Wet a patch with solvent and pull it through your barrel.

9. Remove it from the “pull through” at the muzzle and pull the “pull through” back to the breech using the string you tied to the trigger guard.

10. Repeat several times.

11. Pull three or four dry patches through the barrel and examine the last one. It should be almost perfectly clean. If not, repeat the steps above alternating several wet and several dry patches until the barrel comes clean.

12. Wipe the exposed metal surfaces of the gun with a rust preventative.

You should expect to have to shoot 10 to 20 shots from a clean gun before it settles down to normal performance.