

Colorado Biathlon Club



Marksmanship Handbook

V1.1

Terminology

Cease Fire Stop shooting and clear your rifle IMMEDIATELY. Cease fire can be called by anyone who sees an unsafe act. This should be called out any time anyone extends any part of their body over or across the firing line, or commits an unsafe act.

Clear Rifle To clear your rifle, the bolt is opened, a round in the chamber is removed, the magazine is removed and the bolt is left open. Additionally, the rifle should be placed on the ground pointing down range. This should be done any time CEASE FIRE is given.

Firing Line An area designated to shoot from with numbered positions. More specifically, the line behind which you will shoot at the targets. This line separates the shooting points from the unsafe area out to the targets. You should never cross the firing line for any reason unless CEASE FIRE has been given AND the range has been declared clear.

Firing Point A numbered position on the firing line at which a biathlete shoots at a correspondingly numbered target.

Target Line The area that targets are lined up at in order to assure proper distance from the firing line.

Down Range Any area in front of the firing line or in the direction of the targets.

Prone A Shooting position lying down.

Standing A Shooting position standing up (Off-Hand).

Zero Adjustments of the sight setting that produces point of aim to match point of impact at the center of the target.

Shot Group The area of the target where a number of shots have struck. When a biathlete shoots a number of rounds at a target, most of the bullets should strike in roughly the same place.

Shoot Clean To hit all the targets, No penalties.

Wind Flags Small flags placed at the firing line and down range that allow determination of wind direction and speed.

Bolt Action Conventional type of rifle. The round is loaded and unloaded by rotating the handle upward, pulling back, then pressing forward and rotating down again to lock the bolt before firing.

Fortner Action An Anschutz bolt system that allows loading and unloading by pulling and pushing the bolt straight forward and back.

Position Establishment of a stable shooting position with respect to the support, center of gravity, immobility, and the absence of unnecessary tension on the muscular apparatus provides favorable conditions for the other factors.

Sensory Perception The ability to provide an adequate degree of balance and equilibrium through "kinesthesia" and creating the best conditions for proper functioning of the sensory and internal organs is accomplished through one's senses.

Thought Control Avoiding errors caused by negative thoughts and diverted attention happens by recognizing them and then refocusing attention, replacing or centering it with success-oriented, positive ones.

Concentration (Focus) Limiting the intentional focus to the required and relevant sensory information and cues for successful results is correct concentration.

Sighting/Aiming Is establishing accurate target and sight alignment through the optical-motor process.

Hold Maintaining a steady and durable sight picture free from oscillation or interference of pulse and respiration movements is a proper hold.

Trigger Squeeze Increased pressure on the trigger, releasing the shot without creating movement in the rifle is a correct trigger squeeze.

Follow-Through An immediate analysis of every aspect of the shot provides feedback and evaluation. Since shooting is "an act of judgment," evaluation and adjustment should be made constantly at every step in the processes of firing a shot or completing a stage of shooting.

Golden Rules of Safety

1. Always point the muzzle in a safe direction.
2. Keep the action (bolt) open and rifle unloaded until ready to use.
3. Keep your finger off the trigger until ready to shoot.

Safe Gun Handling Rules

1. Always treat a rifle as if it were loaded until proven otherwise. If you pick up a rifle, the first thing you should do is clear it and assure it is unloaded.
2. Keep your rifle bolt open unless the rifle is on your back or you are in position and ready to shoot.
3. Never race with a loaded rifle.
4. Do not take your rifle off before you are at the shooting point.
5. Don't load your rifle until you are in position with the rifle pointed in the direction of the target.
6. On the command "Cease Fire", stop shooting and unload your rifle at once.
7. Never handle a rifle on the firing line when someone is down range. It also means no sight adjustments while posting or checking paper targets.
8. When dry firing only point the muzzle in a safe direction. Also remove the firing pin and never practice with a magazine.
9. If you see an unsafe act, call "CEASE FIRE" and bring it to the attention of the individual involved and a range official.
10. Store your rifle and ammunition separately out of reach of children.
11. Check the barrel and action of your rifle before using it. Keep all foreign matter out of your barrel and your bolt.
12. No horseplay on the range. An accidental discharge of a rifle is the most dangerous occurrence of any accident. NEVER fool around with any weapon.

13. Do not leave your rifle unattended in a public area.
14. USBA Open Bolt Rule - It is USBA policy for the rifle bolt to be open (bolt handle completely to the rear) once the rifle is removed from its carrying case or taken off the competitor's back. This includes anytime the rifle is left unattended in a rifle rack or lying on the ground or snow. (USBA strongly encourages the use of a rifle cover at all times other than in competition.) Competitors not abiding by the rule during competitions will be reported to the Chief of Competition.
15. Rifles must be unloaded after each shooting bout - that is, no round may be left in the chamber or in the inserted magazine. At the end of training, athletes must perform a safety check before leaving the shooting range by opening the bolt and removing the inserted magazine. Athletes must also remove all ammunition from both the stock and all the magazines before leaving the shooting range.
16. Always point the muzzle of the rifle up or down-range.

Five Fundamentals to Shooting

Position is the foundation for everything else.

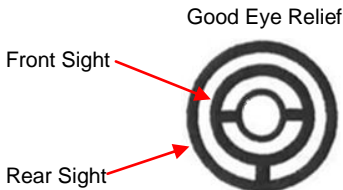
Stock Weld is the point of firm contact between the cheek and the stock of the rifle. The head should be as erect as possible to enable the aiming eye to look straight through the rear sight aperture. If the position of the head causes you to look across the bridge of the nose or out from under the eyebrow, the aiming eye will be strained.

*The eye functions best in its natural forward position. Changing the placement of the cheek up or down on the stock from shot to shot can affect the zero of the rifle because of the perception of the rear sight aperture. A constant and proper stock weld is critical to the aiming process because it provides consistency in eye relief, which affects the ability to align the sights. Consistent placement of the buttstock in the shoulder will assist in achieving a constant stock weld.

Eye Relief is the distance between the rear sight aperture and the aiming eye. The distance between the aiming eye and the rear sight aperture depends on the size of the person and the firing position. While eye relief varies slightly from one position to another, it is important to have the same eye relief for all shots fired from a particular position.

If the aiming eye is too close to the rear sight aperture, it will be difficult to line up the front sight in the rear sight aperture. Moving the aiming eye back from the rear sight aperture will make the rear sight aperture appear smaller and allow the front sight ring to be easily aligned inside the rear sight aperture.

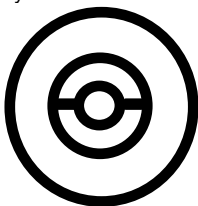
If the aiming eye is too far from the rear sight aperture, it will be difficult to acquire the target, see the front sight ring, and achieve a precise aiming point on the target.



Eye Too Far Back



Eye Too Far Forward



Glasses can alter the perception of sight alignment and sight picture. If wearing glasses, it is critical to look through the optic center of the lens. Ensure the portion of the lens you are looking through is clear and unscratched.

Muscular Control has 2 components: controlled muscular tension and muscular relaxation. The type of muscular control required depends on the type of sling, support, and firing position that is being used. When using the loop sling in biathlon, muscles should be relaxed. Relaxation prevents undue muscle strain and

reduces excessive movement. If proper relaxation is achieved, natural point of aim and sight alignment/picture is easier to maintain.

The loop sling is employed to provide maximum stability. When adjusted properly, the loop sling provides maximum stability for the rifle, and helps hold the front sight ring still, reducing the effects of the rifle's recoil.

Once a sling adjustment is established that provides maximum control of the rifle, the same sling adjustment should be maintained. Varying the sling tension will affect the strike of the bullet, which will make maintain zero sight difficult. Using the same sling adjustment will ensure the accuracy of rounds on target.

Bone Support The body's skeletal structure provides a stable foundation to support the rifle's weight. When possible, the body's bones must support as much of the rifle's weight as possible. Proper use of the loop sling provides additional support. The weight of the rifle should be supported by bone rather than muscle, because muscles fatigue; whereas bones do not. By establishing a strong foundation for the rifle using bone support, you can relax as much as possible while supporting the weapon.

Muscle Relaxation can occur once bone support is achieved. This helps hold the rifle steady and increases accuracy. It also permits the use of maximum bone support to create a minimum arc of movement and consistency in resistance to recoil. Muscle relaxation cannot be achieved without bone support. During the shooting process, the muscles of the body must be relaxed as much as possible. Muscles that are tense will cause excessive movement of the rifle, disturbing the aim. When proper bone support and muscle relaxation are achieved, the rifle will settle into the aiming point, making it possible to apply trigger control, and deliver a well-aimed shot.

Natural Point of Aim is the point where the rifle sights settle when both bone support and muscular relaxation are achieved. Since the rifle becomes an extension of the body, it may be necessary to adjust the position of the body until

the rifle sights settle naturally on the desired aiming point located on the target. When in a firing position, while you are completely relaxed with proper sight alignment, the position of the front sight ring will indicate the natural point of aim.

One method that may be used to check for the natural point of aim is to aim in on the target, close your eyes, take a couple of breaths, and relax as much as possible.

When you open your eyes, the front sight ring should be settled on the desired aiming point while maintaining sight alignment. If it's not, then adjust your body position so that it is.

Adjustments can be made by the following:

- Moving your support hand away from you will lower your aim point.
- Moving your support hand toward you will raise your aim point.
- Moving the stock higher on the shoulder will lower your aim point.
- Moving the stock lower on the shoulder will raise the aim point.
- Adjust right or left by adjusting body alignment in relation to the target.
- In prone, moving your body forward with your elbows in place will lower your aim point.
- In prone, moving your body backward with your elbows in place will raise your aim point.

Aiming is achieved through proper sight alignment and a good sight picture. It is dependent upon a good stable position.

Sight alignment is the relationship between the front sight ring and rear sight aperture and the aiming eye. This relationship is critical to aiming and must remain constant from shot to shot. To achieve correct sight alignment:

Center the front sight ring with the center of the rear aperture. If the front sight ring occupies different positions in the rear sight aperture, accuracy will vary from shot to shot. Accuracy depends upon consistent sight alignment.

Good Sight Alignment

Bad Sight Alignment

Front Sight



Rear Sight



Sight picture is the placement of the aligned sights in relation to the target while maintaining sight alignment. ***You must achieve sight alignment before sight picture even matters***. To achieve correct sight picture:

Place the target in the center of the front sight ring, forming a series of concentric circles. A good sight picture is also dependent upon correct "eye-relief".

A good Sight Picture

A bad Sight Picture

Target



The human eye can only focus clearly on one object at a time. To ensure accurate shooting, observe the following:

- *Focus.* Find your target through the rear sight aperture. Switch to the front sight ring to establish sight alignment and sight picture. Shift focus repeatedly between the rear sight aperture, front sight ring, and target. When the shot is fired it is important to focus on the front sight ring.
- *Peripheral vision.* This includes the rear sight aperture and the target. The rear sight aperture and target will appear blurry. Also, staring or fixing your vision on the front sight ring for longer than a few seconds can distort the image, making it difficult to detect minute errors in sight alignment. If this happens, change your focus or close your eyes briefly and try again.
- *Stock weld and rifle butt placement.* Proper stock weld and placement of the rifle butt in the shoulder aids in establishing sight alignment

quickly. The placement of the rifle butt in the shoulder serves as the pivot point for presenting the rifle up to a fixed point on the cheek (i.e., stock weld). Consistency is key.

Breathing Control Breathing causes movement of the chest and a corresponding movement in the rifle and sights. To minimize this movement and the effect it has on aiming, apply breathing control as follows:

During slow precision fire where time is not a factor, the shot should be fired during the natural respiratory pause. A respiratory cycle (i.e., inhaling and exhaling) lasts approximately 4 to 5 seconds. Between respiratory cycles there is a natural pause of 2 to 3 seconds. This is the natural respiratory pause. During the respiratory pause, breathing muscles are relaxed and the rifle sights settle at their natural point of aim. You should fire at this point using trigger control.

During race conditions, the breathing rate and heart rate are elevated. Take a couple of deep breaths, filling your lungs with oxygen as you establish the stock weld. On about the third breath, let about half out and then hold your breath. Apply interrupted trigger control to compensate for heartbeat (see trigger control). Holding your breath allows the torso to remain still.

Trigger Control is the skillful manipulation of the trigger that causes the rifle to fire without disturbing sight alignment or sight picture. Trigger control is a reaction to what is seen through the sights. Controlling the trigger is a mental process, while moving the trigger is a physical process.

Grip A firm grip is essential to effective trigger control. The grip is established before starting the application of trigger control and is maintained throughout the duration of the shot. The grip involves the palm, thumb, and fingers (excluding the trigger finger). Once established, the grip should be firm enough to allow manipulation of the trigger straight to the rear, without disturbing the sights.

Trigger Finger Placement allows the trigger to be squeezed straight to the rear without disturbing sight alignment. The trigger finger should contact the trigger naturally, but not the rifle stock or trigger guard. It is a squeeze as you attempt to touch your thumb and trigger finger tips together. It is not a pull or a jerk.

Types of Trigger Control There are two techniques of trigger control: uninterrupted and interrupted.

1. *Uninterrupted Trigger Control* is the preferred method for rested shooting. After obtaining sight picture (after sight alignment), apply smooth and continuous pressure rearward on the trigger until the shot is fired.
2. *Interrupted Trigger Control* is the preferred method for biathlon (high heart rate). Apply smooth and continuous pressure rearward on the trigger until an error is detected in the aiming process. Stop rearward motion on the trigger when this occurs, but maintain the pressure on the trigger until sight picture is achieved. Ensure sight picture has settled, and then continue trigger squeeze until the shot is fired.

Follow-Through An immediate analysis of every aspect of the shot provides feedback and evaluation. Since shooting is "an act of judgment," evaluation and adjustment should be made constantly at every step in the processes of firing a shot or completing a stage of shooting.

Training

Position Start training with position at the beginning of the season. This is done primarily through dry firing. It is important to get the same position every single time. It is extremely beneficial to have someone check your positions, preferably a coach, so you are working from a good base the rest of the year.

Dry fire practice should begin with just holding your position for one minute. Take a break and repeat. Check position and sight alignment by closing your eyes for 10 seconds and opening again. If you're to the right of the target, bring your left elbow under the rifle more or move your right elbow in a little. (For a right-handed shooter) To the left of the target, move your right elbow further out. Gradually increase your position time up to 5 minutes. You can also increase the time with eyes closed. These sessions can last from 10-30 minutes.

When you feel comfortable dry firing (just dry fire for a couple of weeks), you can begin slow fire training. Begin all shooting training with a dry fire session. This will continue throughout the year.

Slow fire drills (reverse directions for lefties) Accuracy shooting is better than speed shooting for training. Shoot dime size groups during slow fire prone and in the prone ring for standing.

Single load each shot, call its position, check it in the scope. Every shot is very expensive. Get accustomed to making every single shot the one that really counts. You can work breathing, trigger control, and follow through by shooting on blank paper and checking the group. To group properly, you really need to pull the trigger smoothly and follow through. By not having a black target, you aren't thinking about sight alignment.

Another way to check sight alignment is to shoot on vertical and horizontal bars about 2" wide and 7" long. If you have difficulty with one of the directions, work on your weakness.

The direction your barrel moves onto the target is also important. Shoot from left to right for prone. In prone, the barrel should come up onto the target from below as you exhale. Begin the trigger pull before your sight picture is on the target. Shoot right to left for standing. In standing, move the barrel onto the target from the right, beginning the trigger pull before getting onto the target. This is where a Fortner helps out. It's easier to move smoothly right to left if there is less position movement transmitted into the barrel. Give yourself years before you expect to move onto targets swiftly and comfortably. It alleviates the barrel swinging around as you try getting a perfect picture, causing you to 'jump' the shot. You end up missing because the shot wasn't smooth (trigger squeeze and follow through). This is especially true in standing.

To practice this trigger pull technique in a dry fire drill: draw a sideways 'T' thick enough to see clearly. Start at the right end of the 'T' slowly moving your barrel towards the intersection. Stop when you get there. Now repeat beginning your trigger squeeze before you get to the intersection. Time it so you shoot at the intersection. For prone, use an upright 'T'. Start from the bottom, timing the shot at the intersection. You should focus on a smooth trigger squeeze and follow through. For off season, I would divide slow fire and dry fire about 50/50.

Devote all your time to hitting all the targets prone and standing. When you consistently hit them all with a slow heart rate, practice with an increased heart rate before you increase your shooting cadence. Race heart rate for shooting is about 160. First increase your ski speed the last 100 meters into the range. When you can hit them all, start your speed farther from the range. You increase this distance throughout the season. Your cadence will increase naturally as your confidence grows.

Do range loops hammering into the range. Get into incredible shape so you recover quickly. Next, focus on range procedure itself. Make it as subconscious as possible. Spend 15-30 min/day just going through range procedure during dry fire practice. If you do it repeatedly, you don't think about it, and your mind relaxes. When your mind is relaxed, your body will follow. When you see the 100 meter to range sign, your mind and body should be on autopilot. The excitement and worries of the other athletes shouldn't affect you. Visualize yourself with your act together.