



Rifle shooting

Shooting positions

STANDING POSITION

Biomechanical analysis

The standing position is the most difficult for shooting because:

- the support area of the body is small – this stance relies on only the feet and the area between them
- the center of gravity (COG) of the shooter-rifle system is tall
- there is significant tension in the muscles

STANDING POSITION

Biomechanical analysis

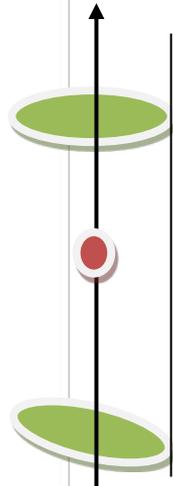
The critical factors of the standing position are:

- minimal use of skeletal support (bones)
- the balance of the rifle and the system body-rifle has to be positioned so that the weight of the rifle is transferred through bones and ligaments to the ground
- the rifle has to be close to the body centre line

STANDING POSITION

Biomechanical analysis

Sagittal setup



It is crucial that the balance of the body-rifle system is above the middle of the support in order to minimize body rocking

STANDING POSITION

Biomechanical analysis

Frontal and vertical setup



For stable control of the rifle movement and recoil, it is effective to have the point of the rifle support on the left hand, the point of the left elbow on the hip and right foot are in line to divide the complete power into both the body's support points on the ground (feet).

STANDING POSITION

Biomechanical analysis

Transversal setup

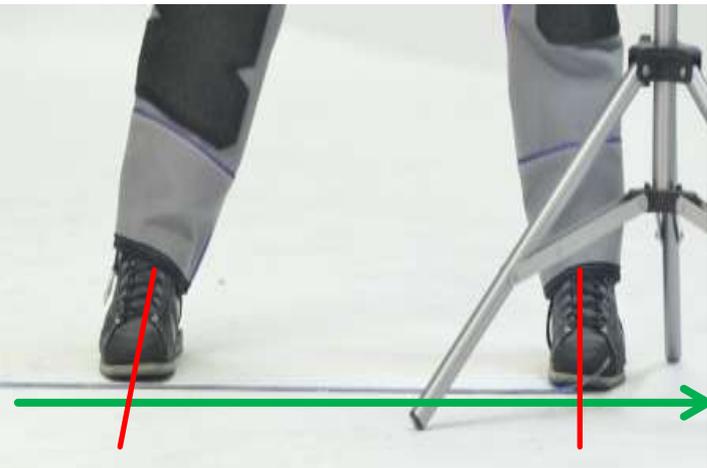


In order to have the rifle as close as possible to the COG of the body, the hips and shoulders should be directed straight towards the target.

The rotation of the body should be minimal.

STANDING POSITION

Feet, Legs and Hips (Pelvis)



The feet are positioned shoulder width apart, or more.

The left foot has a straight angle against the target line (or slightly inwards).

The right foot is either slightly opened or on the straight angle.

STANDING POSITION

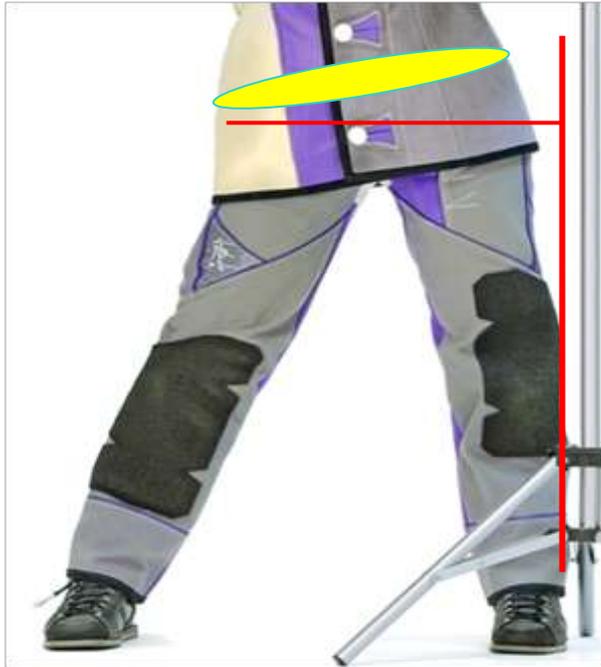
Feet, Legs and Hips (Pelvis)



The legs are straight, with minimal tension of the muscles needed for the firmness of the position. The pressure on the feet should be equally balanced on the toes and heels to relax the leg muscles

STANDING POSITION

Feet, Legs and Hips (Pelvis)



The hips - there is a straight line going through the hips towards the target.

If hips are turned to the side, unequal pressure on the feet occurs and the muscles of the back are tense and tiring faster.

STANDING POSITION

The Back and Shoulders



The back is bent rearward.

All bending occurs above the waist.

The upper part of the body should form a ``S`` in the frontal plane.

Back muscles should be relaxed.

STANDING POSITION

The Back and Shoulders



The shoulders are level and relaxed.

Relaxation should be straight down.

STANDING POSITION

Left Arm, Elbow and Hand



The left arm supports the rifle.

The line of *touch point* of the hand, rifle and the left elbow, should be vertical in the frontal plane.

The forearm should be vertical or moved forward in the sagittal plane.

The arm must be totally relaxed.

STANDING POSITION

Left Arm, Elbow and Hand



The left elbow rests against the left hip or slightly to the right.

The hips are tilted which give a solid platform for the supporting elbow.

STANDING POSITION

Left Arm, Elbow and Hand

The left hand acts as the support point, which plays a very important role in the control of the rifle.



The best way to transfer the rifle weight directly to the forearm is to have the rifle palm rest on the palm of the hand, which will relax the wrist.



Very often shooters tend to use the fist position because most shooters forearms are not long enough to give solid vertical support. To avoid tension, the wrist must be straight and relaxed.

STANDING POSITION

Right Arm

The position and the angle of **the right arm** serves two main tasks:

- to reach a solid contact between the butt plate and the shoulder
- to enable correct and smooth triggering



The higher you raise the right arm, the more muscle strength you will have to use, but there will be better contact between the butt plate and the shoulder with this method.



In the lower position, the right arm is more relaxed but the contact between the butt plate and the shoulder is weaker.

STANDING POSITION

Butt Plate



The butt plate is not leaning on the shoulder.

It is instead leaning against the right upper arm between the biceps and the shoulder.



This position allows the rifle to be directly over the chest, as close to the left shoulder as possible.

The rifle must not touch the left side of the chest (ISSF Rules).

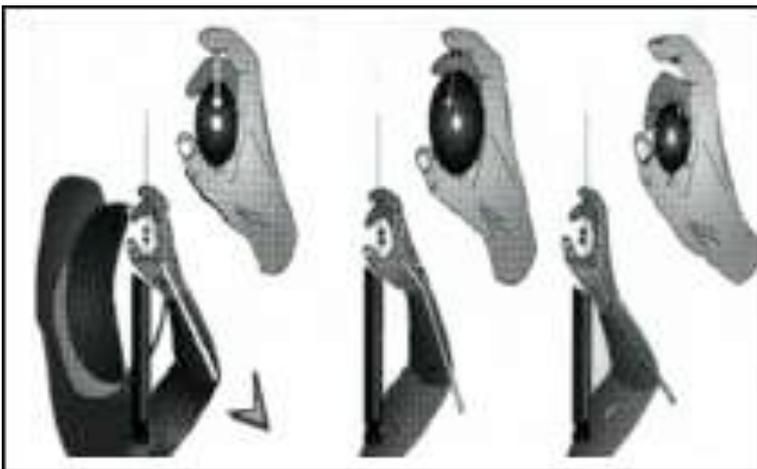
STANDING POSITION

Right Hand and Length of Rifle Stock



The right hand grasps the pistol grip of the rifle moderately to firmly.

The wrist should be straight, with the fingers directing the force straight backward, parallel with the axis of the barrel.



The length of the rifle stock should be positioned to satisfy the condition where the wrist is straight and there is good contact with the shoulder.

STANDING POSITION

Head

The head is straight without bending so that the cheek can lean on the **cheek-piece** of the stock without any effort.

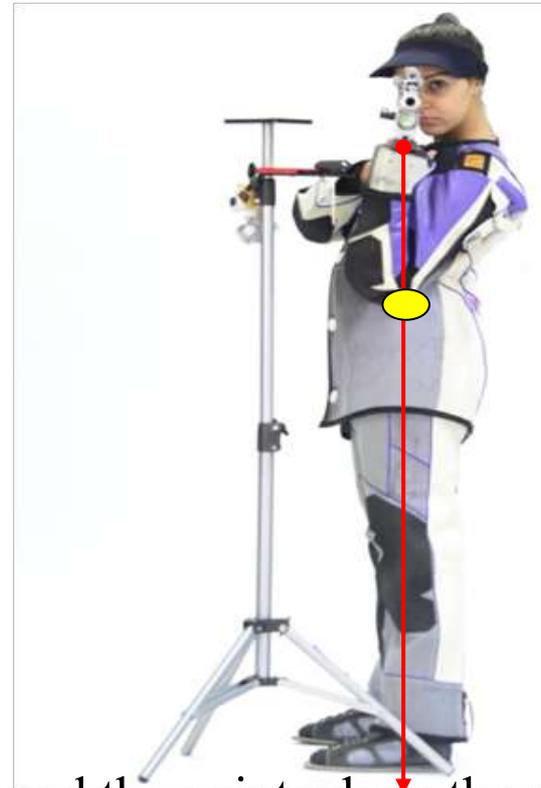
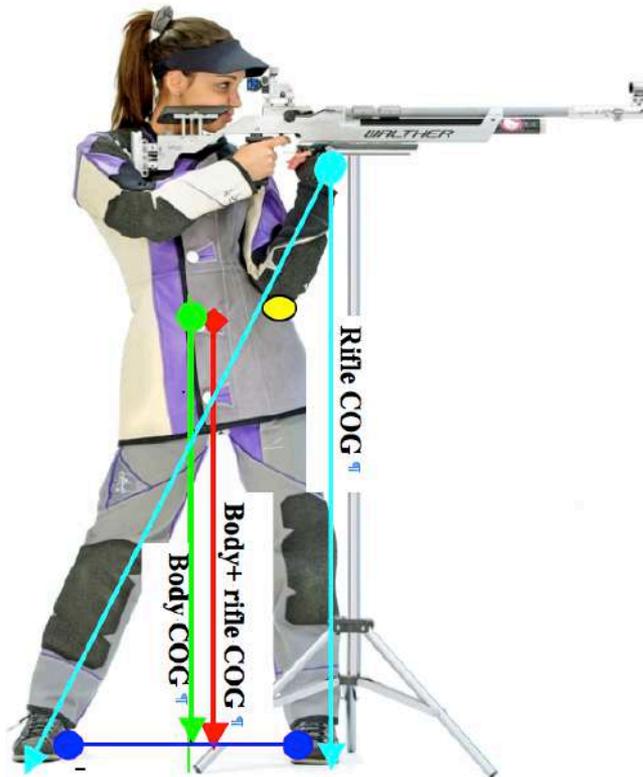


The head normally leans on the cheek piece, which has two functions:

- to provide additional control of the rifle at the back
- provide a head placement where the shooters eye is directly in the line of aiming

STANDING POSITION

Balance of the Rifle and of the Shooter-Rifle System



The balance of the rifle should be around the point where the rifle rests on the hand.

The balance of the shooter-rifle system should be between the feet or slightly shifted to the left foot.

PRONE POSITION

Biomechanical analysis

The prone position is the most stable shooting position because:

- the largest support area of the body
- the center of gravity (COG) is at the lowest height
- the best stability of the system shooter-rifle.

PRONE POSITION

Biomechanical analysis



The most important area is the combination of shoulder, arms and head positioning.

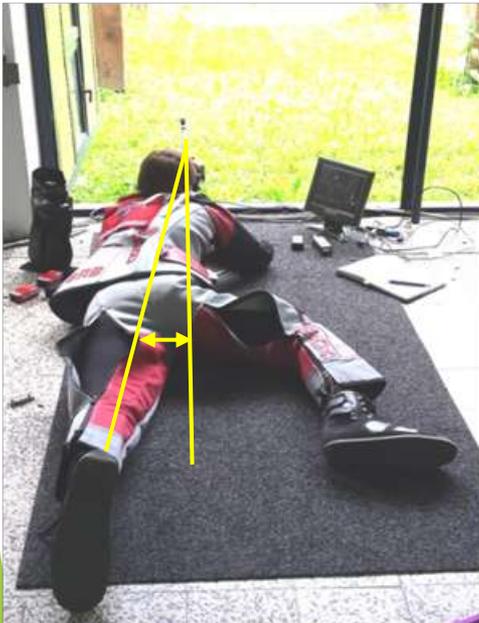
The highest stability of a position is achieved when the COG of the rifle is as close to the centre of this zone as possible.

PRONE POSITION

Biomechanical analysis

The shooter's body should be rotated no more than 20 degrees in relation to the shooting line.

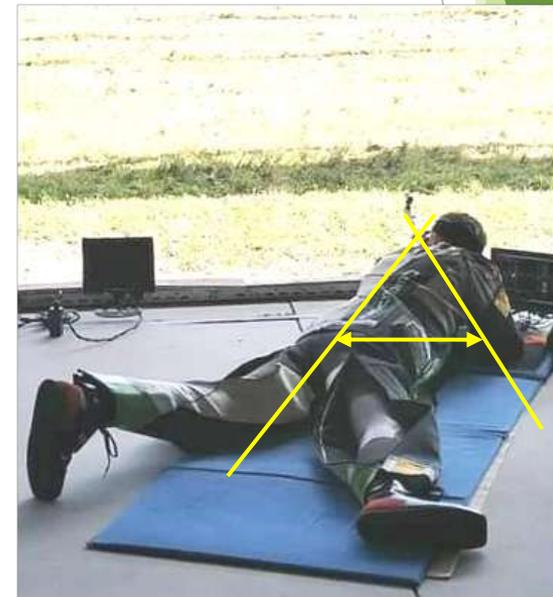
Higher rotations cause the COG of the rifle to move to the right and instabilities in the shooting position.



Straight forward



App. 20 degree body angle



Bigger body angle

PRONE POSITION

Biomechanical analysis

The forces going straight back-forth should be equal, as should the ones going up-down.



The left-hand pressure on the rifle should be equal to the pressure of the stock in the shoulder.

PRONE POSITION

Biomechanical analysis



The pressure of the head on the cheek piece should be equal to the pressure of the right arm and hand.

This acts as a parameter to determine the position of the right elbow.

PRONE POSITION

Biomechanical analysis

The angles of the left forearm and upper arm should be the same according to the supporting area.



In that case the force is going straight back.

PRONE POSITION

Upper body



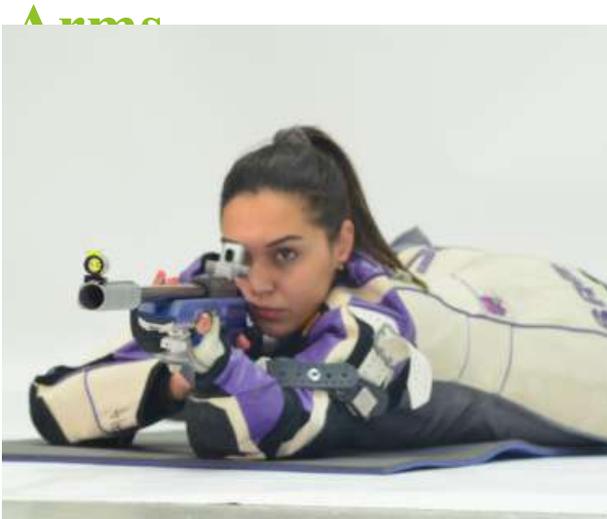
The spine and shoulders are approximately T-shaped.

The left shoulder is drawn forward to slightly open the alignment of the shoulders.

The right shoulder should be relaxed.

The spine is straight.

PRONE POSITION



Left arm is bent at the elbow and placed as far forward as possible to the hand stop.



Left elbow is placed slightly to the left of the rifle.

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PRONE POSITION

Arms



The wrist of the left arm is straight.

The rifle is leaned onto the middle of the hand, a little toward the thumb.

PRONE POSITION

Arms



The right hand holds the pistol grip with a moderate grip.

The wrist should be straight.



The right elbow must always be lowered to the same place in order to maintain alignment of the position.

PRONE POSITION

Head



The head is in front of the spine and leans on the front of the cheek-piece of the stock.

The head should be relaxed.

PRONE POSITION

Sling

The sling should firmly connect the left arm and the hand stop on the fore-end stock.

The sling can be put on the upper arm at two places.



Low position



High position

PRONE POSITION

Position height

The prone position, concerning the position of the left forearm, can be high, low or medium - all three positions are correct.



Low position



Medium position



High position

PRONE POSITION

Position height

The prone position, concerning the position of the left forearm, can be high, low or medium - all three positions are correct.



Low position



Medium position



High position

PRONE POSITION

Biomechanical analysis

The kneeling position has less stability than the prone position because:

- the support area is much smaller
- it is limited to the three points - the left foot, the knee and toe tips of the right leg
- the center of gravity of the system shooter-rifle is higher

KNEELING POSITION

Biomechanical analysis

Depending on the position of the body relative to the target, two options when considering the kneeling position:

- Prone-like position – the body is turned more towards the target
- Standing-like position – the body is turned more towards the right

KNEELING POSITION

Biomechanical analysis

The barrel line (rifle weight) should be over the kneeling roll in order to reach a balanced position.



``Prone-like`` position



``Standing-like`` position

KNEELING POSITION

Biomechanical analysis



The rifle should be above the left foot and the left lower leg must be vertical in a sagittal plane.

KNEELING POSITION

Biomechanical analysis

The pressure of the rifle in the left hand should be same as the pressure of the butt plate in the shoulder.



KNEELING POSITION

Upper body



The back is bent and relaxed straight down or a little forward, depending on the position of left elbow.

The spine should not bend aside.

The right shoulder is completely relaxed.

The shoulders should be level.

KNEELING POSITION

Legs and Feet



The left leg is bent so that the shin is vertical.

The left foot is rotated to the right and the axis of the foot and line of fire forms an angle of 35-45 degrees.

In the prone-like position, the right knee is placed at an angle of about 45 degrees to the right of the line of fire.

The right knee should follow an angle almost to 90 degrees in the standing-like position.

KNEELING POSITION

Kneeling roll



The kneeling roll should be placed directly under the ankle.

The right foot is vertical, so that the toes are straight or slightly to the right.

It should be placed in the center of the kneeling roll.

KNEELING POSITION

Arms

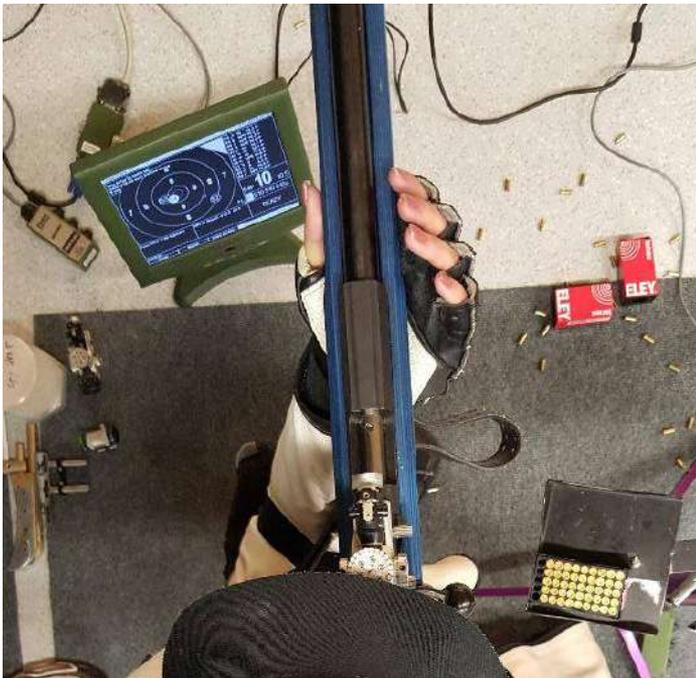
The left elbow can rest on the knee in two ways:

- over the knee with its flat portion just above the elbow, but no more than 100 mm (ISSF rules) or,
- behind the knee, but no more than 150 mm (ISSF rules).



KNEELING POSITION

Arms



The left wrist is straight.

The rifle is leaned against the left part of the hand a little towards the thumb.

The fingers are fully relaxed.

KNEELING POSITION

Arms



The right arm is slightly separated from the body, at an angle of 10-20 degrees.

The right hand holds the pistol grip with the moderate grip.

The wrist is straight.

KNEELING POSITION

Butt plate



The butt plate is placed in the shoulder.



The hook should be between the back and the arm – but may be placed closer to the back - but without a large amount of pressure.

KNEELING POSITION

Sling



The sling is firmly fixed in the upper position of the left upper arm.

Usually, the sling is shorter and the hand stop is closer than in the prone position.