

Introduction to Field Target

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1. Why I Like FT

Simple – you hit the target, it falls down.

Complex -- To do well requires knowledge of physiology, physics, and psychology. It also requires a lot of practice (for me, anyway).

Requires good shooting – this is a precision shooting sport. There are major things that are involved such as having a good rifle and scope, but the minor things are just as important and seem to be almost endless. I hurt my trigger finger nail one day and had a Band-Aid on it. To shoot, I was forced to move my trigger position close to the knuckle. It seemed like I was shooting well even with this handicap but when I removed the Band-Aid and went back to shooting off the ball of my finger I was surprised that my shooting deteriorated! A ¼” (or less) movement of the trigger position caused a significant difference in my shooting! This is but one example of the exploration of things that can affect shooting.

It is an outdoor sport. Most matches are from March through November and you are outdoors during the best part of the year. Yes, you do get the occasional problem with insects, heat, or other realities of Mother Nature, but most of the time this is a great way to spend some time outside.

I have yet to shoot with someone I have not found interesting, and usually they are more than just interesting. When you are (typically) squaded with three people, the two not shooting are often chatting (and watching to see if you hit the target and offering encouragement when you do...). A lot of the time, they are discoursing about something of interest and you will get your turn, too. While this may sound like a distraction, there are many during a match and you must learn to tune out what will bother your shooting.

2. Brief History of FT

Field Target shooting got its start in the early 1980's when a handful of British airgunners attempted to create a new sport to simulate hunting with an airgun. Metal targets in the shape of typical airgun quarry were placed at typical airgun hunting distances. A paper target was placed on the kill area of the animal. Competitors shot at the target and then a judge went down to score the hits and replace the paper kill zone.

This worked well when there were only a few shooters. As the sport grew, the interruption caused by going downrange to score each competitor was limiting. Using a target that could be reset from the firing line with a cord sped up the scoring process, thus allowing more shooters the fun of shooting. The fact that the 1/8" plate steel targets sounded and fell back when hit added immensely to shooter satisfaction and spectator (?) appeal.

Shooters began customizing their favorite airguns and the technology race was on! Gun manufacturers began to claim that their modifications were just what the field target shooter needed to get "one up" on his competition. From this race was born a new breed of airguns; guns that would shoot very accurately at ranges of 50 yards, and with adequate power (maximum 12 foot pounds due to English government regulation) to knock down those metallic targets.

Today, thousands of British airgunners travel all over England every weekend to compete in field target matches, a very "Informal" version of precision match shooting.

Field target shooting came to the U.S. in the mid 1980's, appearing almost simultaneously in California and Florida. Florida hosted the first U.S. Championships in 1987, in West Palm Beach. This match was so well accepted that a small hard-core group of airgunners formed the AAFTA (American Airgun Field Target Association), and immediately scheduled the next Championship in Indianapolis, Indiana in June of 1988.

Field Target came to the WAC in 1997??? mostly at the instigation of Tom Gaylord. We currently host some 10 or so matches per year (roughly 1/month during shooting weather from late March through early November). Classes in most matches include Hunter, Piston, and Open (usually PCP but if someone wants to shoot piston in this class, that is OK). If we have enough entries, Off Hand and Junior classes are offered.

3. Requirements

Rifle – Piston or PCP although a pump or CO2 could be used if you are not expecting to be particularly competitive. \$100 to \$3000 but the USFT is \$1650.

Pellets – about \$.01/shot

Scope -- \$100 to \$1000.

Bum Bag (if not shooting Hunter) or Crossed sticks (Hunter) -- \$13 to ??.

Targets and a Course -- \$5/match at WAC. Usually about \$10/match most places.
Nationals and big matches are usually about \$75.

4. Safety

The usual rules for gun safety apply for airguns, even single-shot models such as are typical in FT.

If possible, open the breech or loading port so that it is obvious that the gun is safe. For break-barrel guns, “break” the barrel (don’t cock, just a sleight break).

When moving between lanes, keep the muzzle pointed downrange as much as possible if carrying in a box or carrier. Otherwise, muzzle down or up as with any other gun.

When loading any spring/piston gun, always keep your hand on the cocking lever or barrel. Even with anti-bear trap mechanisms, these can release and chop off a finger or bend the barrel.

Ricochets are possible – we encourage wearing safety glasses. Ricochets are most likely when you have a split or hit the face of the target. Also, close targets are worse than far targets.

5. Etiquette and Tips

While talking is pretty much the norm, please be respectful of others and keep your voice volume low. If someone asks for quiet, please respect their needs. The British rules say “no coaching or barracking” – we don’t have such a rule. Coaching is pretty typical for new shooters and nobody does much barracking (heckling in the States) but some gentle leg-pulling is not out of line.

When moving between lanes, wait for a shooter to take his shot before moving past. It is OK to move past between shots – you don’t have to wait for them to finish the lane.

Score cards are marked with an X or O – X indicates a hit, O a miss. For Junior Class shooters the usual scoring is 0 points for a complete miss of the target, 1 for hitting the face, and 2 for putting the target down. The scoring is usually O, /, and X, respectively.

You will probably want to bring water and possibly food – matches often take several hours. DIFTA typically has 72 shots in a match, so even if you could shoot as fast as possible, it would probably take about 2 hours – typical matches take about 4 to 5 hours. We usually actually start shooting about 10am and finish about 2 to 3pm).

Some matches use a timer. Typically the time per lane is 1 minute per shot and 1 minute to setup. Thus, a 6-shot lane would have a time limit of 7 minutes. Timing starts when your butt hits the bag or you address the shooting position if an off-hand lane. The time limits are almost never a consideration for most shooters – if you are organized and methodical about your shooting, you can easily finish a lane with time to spare.

At DIFTA, we give a \$5 discount for people that help setup. In practice, most everyone helps tear down. Just like helping with the dishes if you are invited to dinner, be nice to your hosts (match directors shoot for free but put in a lot of time designing the course, maintaining targets, etc. and really appreciate help).

Normally, we shoot from near target to far target. If you want to shoot in some other order, just announce your plans before shooting. For instance, if there is one off-hand target in a lane, many people will either shoot it first or last – last is most typical since you can range it while sitting and save the down-up-down to range, shoot the off-hand, then shoot the sitting targets.

For multiple off-hand shots in a lane you can range the far and middle targets and memorize the distances (or write them down). You range the near target last and then you shoot near to far resetting the scope and elevation (don’t forget this!) for the middle and far targets. This saves a lot of time and physical effort on such lanes.

When confronted with a dark target, you can often gain enough visibility to shoot by lowering the magnification of your scope. Basically, the light getting to the eye will increase when you lower the magnification. I have found that it is far better to see where you are shooting than to shoot more-or-less blindly at 40X (for instance). I did some experimentation one day shooting a target at 55 yards at 40X down to 8X in 8X steps. Until I go to 8X my scores were about the same – at 8X they deteriorated. I know that many will argue with me, but I firmly believe that you will be better off at 16X, for instance, seeing the target (even if smaller) than at 32X or more and seeing a gray blob with maybe a kill zone in it somewhere.

6. Rifles

6.1. General Specifications

Accuracy (~.2" or better at 30 Yards)

.177 (.20 or .22 is OK but speed and size disadvantage)

20FPE maximum power (926 fps with .177 CPH; 800fps with .20/.22 CPH)

Scope mounts

Powerplant:

- Piston (spring, usually) or
- Precharged compressed air (PCP) are the two most common power plants.
- CO₂ doesn't work well for FT because the power is generally somewhat lower (not always) and it doesn't work well when the temperature is below 65 or above 95 Fahrenheit (both of which can happen on a single day of FT shooting).
- Can you use your pump, CO₂, or whatever – sure, just don't expect to be competitive unless you are the world's best shooter.

6.2. Piston



Beeman R9 ~ \$260 - \$325



HW97 ~ \$430



Arms TX200 ~ \$480 (without a scope!)

Air

Pros

Cheaper

No tanks, etc.

Most common in Hunter Class

Cons

Not quite as accurate but shoots in a separate class.

Somewhat harder than PCP guns to shoot well.

6.3. Pre-Charged Pneumatic



Air Arms S200 ~ \$400 without the scope. The S200 is only about 12fpe and roughly equivalent in power to many of the piston guns.



The only cheaper PCP gun is the Chinese-made X50 which costs about \$300. This has more power than the S200.



Air Arms EV2 ~ \$1800 (only in 12fpe version)



Falcon FN19 ~\$1200 (no scope)



Daystate MK3 FT ~ \$1700 (no scope)



The factory Steyr LG100FT ~ \$1775 (no scope). -- The tendency is to ship them to Allen Zasadny or some other tuner for tweaking eventually and you are then at about the same price as if you bought directly from Allen Zasadny. Most of the 10 Meter target gun makers have a FT version for a similar price. Very few are considered to be equivalent to what you can get from a custom modifier for not much more.



Steyr LG100ZM ~\$2000 (no scope) in a base model to more like \$3000 as shown with the knee rest, angled hand-grip, and arm hook. Allen can provide the gun complete with a scope and calibration – ready to shoot. Thomas Jones is selling his like this for \$1800

(unless already sold). Some used ones are likely to be available now that the USFT is being shipped.



USFT ~\$1650 from <http://www.maclairgun.com/usft.htm> – probably the best buy available today. Not your standard gun! If you want something that looks “normal” don’t get this gun. [On the other hand, the Steyr is hardly a “normal” gun but I have grown used to it and similar 10M models...] The USFT (nee the LDSS) was designed by Larry Durham to be a very accurate, very efficient field target gun. It is! You can get ½” of better groups at 55 yards (depending on the shooter – the gun is guaranteed to be able to do this when delivered) and it shoots at a relatively low pressure (1600psi or so) and gets about 90 shots on a fill. From an accuracy and efficiency viewpoint, this gun is unbeatable.

Pros

Most accurate airguns, but PCP guns shoot in the Open or PCP class which is separate from the piston guns.

Most innovation occurs in PCP since they are simpler to build (not necessarily cheaper because of this).

Cons



Needs a source of compressed air (tank or pump) – figure at least \$100 for a pump and \$200 to \$400 for a tank. You will be far happier with a 4300 to 4500psi tank. They hold a lot more usable air -- if you fill a gun to 3000psi and your tank is “empty” when it gets to (say) 2600psi, and then you will only get a few fills from a 3000psi tank while the 4500psi tank will last through many fills. The best buy is the 4300 Luxfor 106 cu ft 4300 psi tank but it weighs about 50 pounds. A 4500 psi carbon fiber (aluminum internally) tank is about 20 pounds and hold 88 cu ft.

PCP guns tend to be the most expensive although the Air Arms S200 costs about same as top piston guns and a Whiscombe piston gun costs as much as a PCP.

7. Pellets

Crosman Premier – widely regarded as one of the most accurate pellets available. Also, widely regarded as one of the worst pellets from a quality control point of view. Very dirty as received – almost everyone washes and then lubricates them (all pellets have some lubrication as a result of the manufacturing process – if you wash off the lubrication, the lead will oxidize and leave as much or more gunk in your barrel as if you did nothing to the pellet). There are two forms of this pellet, the CPH (Crosman Premier Heavy) is about 10.5 grains in weight and is mostly used in PCP guns. The CPL (“Light”) is mostly used in piston or low-powered PCP (like the AA S-200) guns.

JSB Exact is becoming one of the most popular pellets. It is clean, consistent (good factory quality control), and accurate. It does not need washing but many people do lubricate them. It is available in both Heavy and Light weights. It has exceptional ballistics characteristics (not saying a lot because all pellets are incredibly bad ballistically because of the small diameter and the badminton shuttlecock shape). Still, compared to the CPH, these are much better. JSB Exact Heavy pellets have been hard to find lately. They only became available last year and the supply dried up until the manufacturer in Czech Republic catches up.

Beeman Kodiak Match pellets (same as the H&N Barracuda) are clean, consistent, and accurate.

All of these pellets can be (and are) used very successfully in FT today. The choice is one of which shoots best in your gun (and some guns seem to not like some pellets for some reason) and how much you are willing to tolerate dirt and manufacturing consistency.

Another note – when you find a pellet you and your gun like, buy lots. When your stock gets down to, say, 6-months or so (3,000 pellets? – you do shoot a lot, right?), buy at least another year’s supply. You never know when a shortage may occur.

Good sources for pellets are D and R (Crosman and Beeman) and Top Gun Air Gun (JSBs). Especially for JSBs, you may have to look around and buy what you can find for a while.

7.1. Most important criteria for a good pellet

Accuracy – while a lot of good shooting is up to the shooter, having a good rifle and a consistent pellet can be a huge factor. I have seen my Steyr LG100ZM spray pellets all over about a 1” circle at 30 yards when I start shooting JSB Exact Heavies much faster than about 900fps. Pointed pellets are notorious for sometimes being inaccurate.

As an example, Rada Plesinger tested 12 different .22 pellets in the same gun and under the same conditions (as much as possible). His results will not correlate to your gun and pellet size but the information is useful to show just how much difference just the pellet can make:

Pellet	Group Size (Inches)
RWS Superpoint	.204

Barracuda	.268
JSB Exact 5.52	.274
Diabolo Pointed H&N	.288
Silver Ace	.330
JSB Straton 5.50	.349
JSB Exact 5.51	.368
Silver Jet	.377
Crossman Premier Die #1	.410
RWS Superdome	.507
RWS H-Point	.675
Silver Arrow	The group for this pellet was so erratic he could not measure it.

Ballistics – a high ballistics coefficient (BC) means that your pellet will still be going faster downrange than one with a lower BC assuming both left the barrel at the same speed. This will mean both fewer clicks (or holdover) and less windage (less time in the wind means less effect from the wind). Published BCs for the above pellets range from .020 to .035 with the JSB Exact Heavies being as high (or much higher in my experience) than most other pellets.

Speed (which is really largely a function of weight). Heavier pellets will be slower assuming a (relatively) constant power. Some people think that heavier pellets will be less-affected by the wind but the longer a pellet is in flight, the more the wind will push it sideways. Hence, my money would go to a pellet the will leave the gun at least 800fps. There is no sense using a heavier than required pellet as long as sufficient energy is delivered to the target at 55 yards (and most well-designed targets will fall with just a few foot-pounds – a common test is to use a 10 meter pistol to see if the target will fall and these put out about 4fpe).

7.2. Pellet Cleaning

Pellet washing is usually only needed for Crosman pellets. They are very dirty at least when you buy in bulk (1250 pellet boxes). You can clean them by washing with a detergent or solvent. The residue is at least partially lead dust – dispose of the debris with used pellets.

If you use a solvent, you can recycle the lead and the solvent just by pouring all the guck and solvent back into the original container. The guck will sink to the bottom and the clean (enough) solvent can be reused. This will clean a lot of pellets until you have to worry about getting rid of the guck (lead dust) safely.

You can spread the pellets out on paper towels if you use water to wash. If you use a solvent (paint thinner, whatever), they will quickly dry in the can if you leave the lid off.

Once they are dry it is time to lubricate (otherwise they will oxidize so this is a must if you wash).

7.3. Lubrication

Krytech (Finishline bicycle chain lube) is very popular and works with both piston and PCP guns. Piston guns tend to Diesel (burn oil) and will sound like a .22 if there is too much oil in the piston or chamber. Krytech dries and is waxy (basically, a Teflon material) so it works fine in all guns. Krytech was tested by Larry Durham and found to be the only lube that improved accuracy. All lubes help with keeping the barrel clean.

1Lube is oilier. This is the lubrication recommended by Allen Zasadny.

Technique for application: Start with a large pellet tin or a ½ filled tin (or any other container that will hold about twice as many pellets as you want to treat). Put a few drops (3 or 4, do not fill the lid!) in lid of the tin. Put the lid on and tumble for a minute or so to distribute the lubrication on all the pellets. You can then leave the lid off and let the pellets dry in the same tin or pour them into some other tin. Leave the lid off (especially for piston guns) and let them dry. When dry, you can shoot them safely in a piston gun. For a PCP, you can shoot them immediately but most people let them dry for a few hours.

8. Bum Bag or Stool



Some Bum Bags from Airguns of Arizona web pages (<http://www.airgunsofArizona.com/>). Very hard to find many sources for these. I like foam pellets but some people swear by cork and other fills. Foam pellets compress over time (but most fills probably do). You should buy more than enough fill than needed for the initial filling. Also, fill to excess initially as it will pack down fast the first few times you sit on it.

<http://www.straightshooters.com/logun/logunbuttseat.html> has the Logun bag for \$40.



Another popular option (from Cabela's for \$13). Many people cut off about an inch or so of the legs on one side (not both on the same end) so that they can level the seat by rotating it. DIFTA has a fairly sloping set of lanes with lanes 1-9 forcing people to have their feet higher than their butt unless they use a fairly thick bag or stool. I have not tried the stool but it is popular with quite a few people.

Also used – Steve Schulz swears by some towels folded into a backpack (he won the Nationals 3 years ago).

A chair or other place to sit while others in your squad are shooting is very handy!

9. Beyond the Requirements



These pictures show a shooter using a strap (Airguns of Arizona web pages (<http://www.airgunsofarizona.com/>)) to help support his position. This is not a requirement for shooting well. If you have back problems, this can (reportedly) help with the sitting position (or you could shoot Hunter class).

FT shooting requires a fair amount of flexibility (less so for Hunter). If you follow a regimen of stretching and strengthening exercises, you can both shoot better and have fewer back problems. I highly recommend the exercise approach as using something like the sling above may help but you will still have back problems in other situations. My approach to shooting is based on the Steve Schulz model – if Steve can shoot “naked” (no aids at all) and win, then I should be able to do the same thing. Steve is probably a “natural” shooter (or, at least, has a lot more experience than I do) but I aspire to get as much out of my equipment as possible without resorting to “the dark side” and using a harness.



I have gone to the “gray side” by using a shooting coat. This is the difference between being a 40T and a 60T shooter for me. I have a fairly rapid heartbeat and think (the psychological aspect may be predominating) that this helps give me a small edge over just fairly heavy clothing. Coats are fairly expensive -- \$250 to \$500 new – so don’t go down this approach until you are pretty sure you have done everything else your body,

gun, and pellets can do. I got a used coat for \$75 that was an incredible bargain but these are fairly form-fitting so just any old coat won't necessarily work for you.

10. Sticks (Hunter Class)



Attaches to belt

Cabela's or similar stores carry these or just use a pair of crossed sticks held with a rubber band.

11. Barrel Cleaning

Basically, this is only needed if you are not shooting lubed pellets. As a rule, you only need to clean when accuracy deteriorates.

When you clean, **do not use a metal rod** as they can damage crown (the muzzle). They can also damage the lands. General consensus is to use a pull-through (Boresnake or Crown Saver).

If you have a moderator/deflector/dust-collector/whatever on the barrel, you can use a plastic straw to help feed the plastic string or cord through the barrel. I cut off the end of the brass weight on my Boresnake so it will fit into my breech.

A cheap and effective pull-through for cleaning airguns can be made from a length of .080 weed whacker cord. The plastic cord will not harm the rifling or crown like a cleaning rod will. To make the pull-through you first cut your length and make sure to cut an angle on one end. This angle (point) is used to puncture a patch when cleaning. The other end is melted into a blob using a lighter. I heat up the end then press it against a metal surface to create a flat pad on the end. Then I use a nail file to contour the pad into a size that will perfectly fit the guns bore. File the pad around its perimeter and keep checking the fit in the bore.

When all is completed, a patch is pierced with the sharp end of the cord and slid down to the pad. Then the sharp end is fed into the breech like a regular pull-through. This type of pull-through can be fed into short breech areas where a regular unit cannot because of inflexible metal ends.

You can buy this sort of pull-through from various sources (mac1airgun.com is always a good place). Another commercial solution is the Boresnake but get one without the brass brushes. (Mine came without brass brush but it could probably be removed fairly easily if necessary.) WallMart carries the Boresnake (\$12 or so, I think it was) and at least the one for .177 did not have the brass bristles.

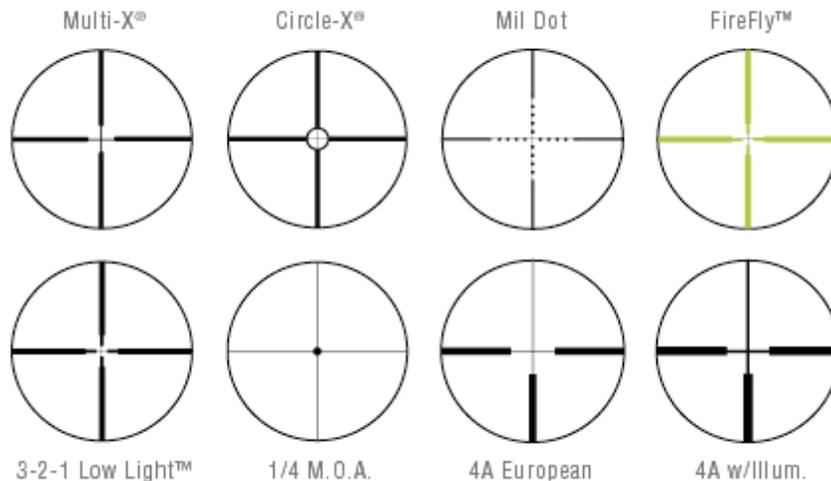
For all methods, if you want, you can put a bit of solvent on the Boresnake or on patches if using them (I use a few drops of 1Lube if anything). Also, I had to cut the Boresnake weight about in-half so it would fit into my breech.

12. Scopes

12.1. General requirements

Objective: 40+mm. Bigger is better since you get a brighter image and the depth-of-field is reduced for better focusing with larger objectives. Optical quality can override diameter (for instance, everyone claims the Bushnell 4200 is as bright as any scope – I have no experience with this myself but the Bushnell is very popular even with the best shooters).

Power: 24X minimum – 32 to 60X is perhaps better but a lot of people have won a lot of matches with 32 to 35X scopes. Focusing might be a bit better at higher magnifications but the image brightness decreases as magnification increases so there is a limit of how useful increased power can be. Zoom eyepieces are not (usually) of the same optical quality as fixed eyepieces – hence the popularity of fixed-power scopes such as the Nightforce 36X, Leupold Competition 35X, and Sightron 36X. The Leupold Competition comes in 40X and 45X but nobody uses those (probably because the image gets too dim).



Reticule: Mildot is very nice for windage although only Hunter Class people use the elevation marks. Since the dot spacing usually varies (on the target) with changes in the eyepiece magnification, you will need to always shoot at a constant power to really use these very well. (A few scopes have the reticule placed so the dot spacing is constant with eyepiece zoom.) Most scopes can be modified to have the reticule replaced with a mildot for about \$100. Other reticules can be used but you probably want something with fairly thin lines in the middle such as the Bushnell examples for the Multi-X, Firefly (a luminescent reticule), the 1/4 MOA, or the European. Having some way to “measure off” a fixed distance such as is the design for a Mil Dot is handy but not mandatory for windage guesstimation. Illuminated reticules are nice when shooting in really dark situations but the need is relatively rare, especially if you have a good scope (with a large objective lens that lets in lots of light).

30mm tubes are somewhat better than 1” (25.4mm) since more light can get through a bigger tube and (probably more important) you can get more clicks in a larger tube.

Focusing (Parallax correction/Adjustable Objective) – the last thing you want is for your target to shift position with a shift in your eye position. This will happen if your scope is not focused on the target. Also, focusing is the only allowed way for range finding (no laser range finders although there was a scope with built-in range finding for about \$4000 several years ago that is probably legal). There are three ways to focus:



Front (1 or 2-turn) – you turn the objective housing to focus. Two (or more) turns makes for more precise focusing by spreading out the scale at the farther distances (especially 45 to 55 yards) but means more turning. Only Sightron, Nightforce 36X, and Unertl scopes have multi-turn focusing.



Side – a knob on the left (usually) side of the scope (like this Leupold Competition) where the elevation and windage knobs are also found is used for focusing. For some scopes (BSA, Nikko Sterling) even with a very large add-on knob (extra cost – only about a 3” knob comes with the scope) the distance from 45 to 55 yards may be as small as about 1/4” or so. The Tasco and Hakko are a bit better. The only side focus (that I know of) that really spreads this scale out is the Leupold Competition. In virtually all cases, a large wheel is purchased if one does not come with the scope.

Rear – the advantages are minimal: not having to reach forward to the front bell. The disadvantages are large – difficult to accurately read distances (high-precision scale). Not recommended unless you have a handicap.



Side wheel from www.pyramidair.com – not sure it fits all scopes but they have some good prices on scopes, too. Unfortunately, most of their scopes max out at 12 to 16X. Rick Lake of Lake Precision Machining up in Hagerstown, MD ((301) 790-4022 and lpm@lakepm.com) makes custom knobs for about \$75 (I suspect you only get it made for you for that price – not that you have options galore). Allen Zasadny (847)838-0187 makes them, too.



Target Knobs – if you are going to use your elevation knob for adjusting your aim point of impact for distance (highly recommended for non-Hunter shooters), then Target Knobs are essential. These knobs can be easily adjusted at all times while some scopes use a coin or screwdriver adjustment and have a screw-on cap.

You will probably want a large knob to extend the elevation knob's diameter to make it easier to put a longer (easier to read) scale on your knob. Another approach is to code your distance scale with the knob setting (basically ignoring actual distance). If your distance scale measures in yards, then your elevation knob is calibrated in “yards.” If

your distance scale measures clicks, then all you need is a target knob that is easy to reset to a specific setting. Sources include Airguns of Arizona (<http://www.airgunsofarizona.com/Scope%20Accessories.html>), A-Team (<http://users.bestweb.net/~ateamray/index.htm>), Allen Zasadny (847)838-0187, and Rick Lake of Lake Precision Machine, Inc. (lpm@lakepm.com or 301-790-4022).

For all scopes, the distance scale that comes with the scope is usually ignored and people either manually make marks on paper/plastic/etc. noting the distances. One technique is to make a scale like one can do ballistics – do it for every 5 yards and interpolate the one-yard marks between. Another technique valid only for front-focus scopes is to generate a scale since the distance turned is a simple function of the distance to the target (proportional to $1/\text{distance}$).



If sunlight on your eyepiece causes problems (it does), this is a good solution that is shown on a video camera. It works great on a scope and works with glasses. This is basically a cloth hood that fits over your eyepiece that will fit any scope. It will push forward out of the way if not needed. It is available from <http://www.i-cuff.com/buy.html> for \$29.95.

Hunter Class Has Limits on Power/Usage with a maximum of 12X and no “clicking” (but Mildot OK). If you have a zoom eyepiece scope, you are allowed to set it to 12X or lower and shoot without modifying that setting during the match.

Piston Guns require special scopes -- reverse kickback from a piston gun (these guns kick forward rather than backward – not the case for TX200, HW97, or Wiscombe) is tough on scopes and not all scopes can handle this. Look for “airgun rated” scopes or check for unlimited guarantee. If it is being used on your gun for serious shooting, the scope is probably OK.

12.2. Scope Suggestions

B&L/Bushnell Elite 4200 8-32X40 ~ \$500. This is generally considered the “best buy” in FT scopes.

Sightron 6-24X44, 36X44; 2-turn focusing ~\$400. Excellent quality and the only 2-turn focusing scope available today except for Unertl (which nobody uses for some reason – might be price and availability).

Hakko/Nikko Sterling 8-40X56, 10-60X60 ~\$922. The Nikko is available in the US but the Hakko is difficult to find (try Canadian suppliers). The Nikko is basically the same as the old BSA Platinum. The Hakko is basically the same as the Tasco Custom Shop. (Both scopes used are about \$400+). The Hakko is very popular in the UK; the Nikko is pretty popular in the US. Quality seems to be iffy for the Nikko – I would get one from Alan Zasadny or someone that will select and calibrate even if it costs a bit more (unless I could select from several scopes before buying).

Leupold 20-50X50 ~ \$1000 from Premier Reticules (Leupold scope is roughly doubled in power. The reticule can be replaced with mildot or whatever you want when buying).

Leupold Competition 35X45 ~\$1000. If you want mildot, then Premier Reticules is the source for this scope. This is a very popular scope among top FT shooters.

Nightforce 36X56 (only available used ~\$1200). This scope was especially designed for FT but is no longer available new. It has 2-turn focusing. I missed one for \$650 on eBay once (DOH!).

12.3. Scope Mounts



BKL – Almost undoubtedly the best and not expensive (~\$47.50/set) Order direct (<http://www.bkltech.com>) or through most airgun shops.

Reach Forward available for cases where you need room for side wheels

Double strap models are cooler looking but not needed even for piston guns.



A scope level is highly recommended. This one screws into the side of the BKL mounts but others are available that will work with any mount. An electronic one is available that fits onto your eyepiece so you can see if your scope is level while sighting (also claims to be more accurate).

Because of the close distances we shoot (relative to the scopes being used, anyway), it is often necessary to tip the scope eyepiece up a bit relative to the barrel axis. You can buy mounts with this angle designed into them from BKL or Mac1Airguns.com. You can usually shim your rear mount with a layer or two of aluminum can metal as a substitute. (The disadvantage of shimming is that the scope mounts are not aligned with the scope tube any longer and can put stress on the scope tube. There is a chance that you could dent or put mount marks on your scope by shimming but unless you need more than one or two layers of can, I don't think this is a problem.

The scope reticule should be centered to adjust the slant/shimming. Turn the knobs all the way from one end to the other, counting the turns. Turn back $\frac{1}{2}$ the counts for each knob. This should center the reticule. Now shoot at 25 to 30 yards and adjust your point-of-impact by shimming rather than by using the elevation knob (you can adjust the windage just using the knob).

For the BKL solution, you center the reticule and measure the distance between your aim point and point-of-impact and BKL builds you a set of mounts with the cant designed into them. You can also buy canted mounts that will probably be good enough.

13. Targets for Home Practice



Dick Otten "Popper" ~ \$55. <http://fieldtargets.com> or at Roanoke. I have had one for almost 2 years and have put a lot of pellets into it. My trigger paddle is almost worn through so even the best targets don't last forever in FT. This (and most) such targets can be repaired with some welding or other minor metalwork – the two areas of wear are the trigger (if you hit it often) or the hole (if you miss or have splits a lot). For DIFTA, it is usually the hole that wears. For home, it will (should?) be the trigger paddle. I initially shot 30T (30 yards/1" hole equals 30 Troyers) – when you get up to 70% or better, start shooting 45T or 60T. Do shoot both short and long – there is a psychological element for me when I shoot at a small hole (1/4" for this target) at 10 yards (40T). Psychologically, I prefer shooting at 1/2" at 30 yards (60T) far more than the small, close shots. My brain thinks there is more wiggle room for the larger hole at the longer distance even though it is actually a harder shot.



IFP for Paper Practice (PDF file on CD or a 30 and 55 yard target are at the end). The advantage of IFP for FT (in my opinion) is that for FT shooting you do not have a precise aim point. (People will argue about this including claiming they are aiming at a speck of lead...). IFP is a close simulation of this and it does make a difference not having a precise aim point. In general, the inner circles are 60T in difficult, the outer 30T. If you can shoot 40 or above, you are very ready for FT. (Scoring is "outer" and you get 2 points if your pellet is entirely within the outer edge of the inner circle, 1 point for the same on the outer circle, 0 otherwise – to get 50 is to have all pellets inside the small circle. The top score is 49 by Alan Zasadny shooting in a tunnel.)



Pellet Trap (Champion ~ \$55, Beeman ~ \$69, Outers ~ \$85 but they seem to be identical and are all rated for .22 rim fire) – the “airgun” traps may not hold up but this one does). These are heavy so getting one locally may be worth the extra effort. I have an Outers brand trap that sits outside year-round and does not rust, dent, or do anything but work just like it should. Some other traps claim to be quieter, cleaner, easier to load, whatever. I want something that works and lasts. I do feel it is necessary to have a backing if you are using this indoors to cut down on the mess (lead splatters, paper shreds, etc.).

Room to shoot: 10 to 55 Yards is what you need. In general, the longer the better for FT practice because the longer shots are usually the hardest both because of the Troyer rating and because wind is much more of an effect. IFP targets are available for 10 Yards and other distances – the 10 yard targets are almost impossible to score because the pellet is as large as the inner hole. In most cases, you can get 10 yards in your basement. If you are lucky enough to live in an area with tolerant neighbors and/or no restrictions on airgun shooting in the back yard (Frederick County but not Montgomery), so much the better.

14. Clubs

DIFTA

DAFTC – Harrisonburg, VA

Brookhaven in PA (all offhand)

Delran NJ (seems to be somewhat inactive for FT lately)

AAFTA for more clubs. Being a member only costs \$25/year.

15. What's Easy/Hard?

15.1. Troyers

Troyer Rating is target distance in yards divided by kill zone size in inches (times some fudge factors)

Easy: 10T (1" at 10Yds, 2" at 20 Yds)

Moderate: 25T to 35T (1" at 30Yds, ½" at 15Yds, 2" at 55 Yds)

Hard: 45T to 60T (1" at 55 Yds or ½" at 30 Yds)

Fudge factors: 2X Standing, 1.5X Kneeling or wind, 1.25X more than 40 Yards. There can be multiple factors such as windy and kneeling and 40+ yards which is 1.5 X 1.5 X 1.25 or 2.8125 so a 2" target at 40 yards, kneeling, and under windy conditions would be $40 / 2 \times 2.8125$ or 56.25T which is a very hard shot.

15.2. Course Design

When designing a course, one is confronted with trying to fit a combination of existing targets (DIFTA has some 60) with varying distances. In practice, we rarely move the target positions (a lot, anyway) but pick targets to vary the difficulty of the course. Too hard a course is not much fun for anyone (read 45+ Troyer average difficulty). Similarly, too easy (say 20T average) is not much fun for the better shooters. The solution is to have a range of difficulties with an average of about 25T to 35T but some (maybe 1/lane) that are easier and 1/lane that is harder (40T+). It is not necessary to have a lot of harder targets to separate the best shooters scores – a course of all 40T would probably not be “cleaned” in 72 shots.

At DIFTA, I like to have a lane of all off-hand (standing). This is more difficult than, say, having three off-hand shots spread among the lanes but does not require that you shift positions at a lane. (It is allowed to range while sitting – just range from far to near and remember the two far distances. Then stand up and shoot near to far.)

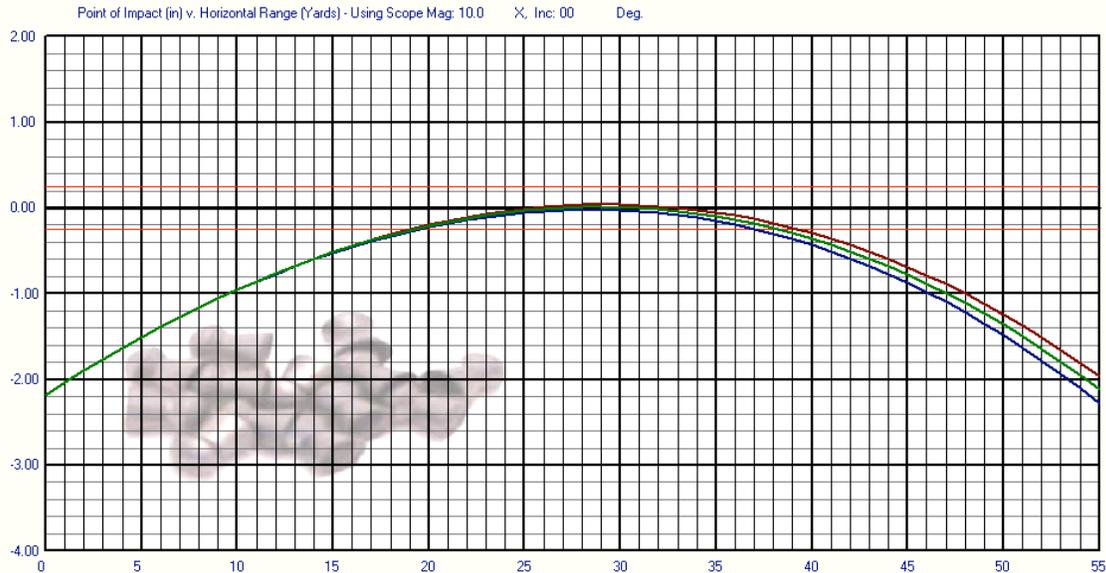
15.3. What to expect at a match

You won't clean the course. You won't have a zero. You will probably hit about 25% or so when you start but you should progress to about 60% (for piston and PCP classes) pretty quickly once you figure out your gun and position.

After a year or so, you should be hitting 75% or better. The last 25% depends on how serious you are.

The nice thing is that the fun begins with the first shot. There will be lots of chatting especially among the people in a squad that are not shooting. Learning to maintain your concentration is part of the game, I think. Nobody will intentionally try to distract you, but it is very easy to get involved in the conversation (even if you are just listening) and then you blow a shot (been there, done it many times).

16. Ballistics (Really Easy Way)



The above graph from Chairgun shows what is happening to a pellet when shot. Initially, it is 2.18” below the aiming point if you are shooting at 0 yards (pretty hard to do) – this is the distance between the center of the scope and the center of the barrel for my gun. This distance is the dominate effect on ballistics until you get to about 30 yards.

Beyond 30 yards, then dominate effect is drag on the pellet. Also note that variations in velocity, pellet weight, etc. have very little effect until you get to 30+ yards.

The left scale is in “Hold Over.” The bottom is yards from the muzzle. The three arcs are the most probable trajectory (the middle line) and the upper and lower limits of the trajectory assuming worst cases of lowest velocity and heaviest pellet (lower line) or highest velocity and lightest pellet (upper line).

The two red lines are the optimal zero point for an assumed .25” kill zone (pretty small, actually). In other words, if you forget all about ballistics, using this information says that you will be just fine from about 20 to 38 yards. You can stretch this distance a bit by assuming that the top of the arc is at the top of the (assumed) kill zone and the kill zone is more likely to be ½” then we could forget ballistics if we are shooting anywhere from about 13 yards to 40 yards. In actuality, kill zones tend to be bigger at longer distances so, assuming a 2” kill zone at 55 yards, we can forget ballistics from 13 to 54 yards. We will hit too high sometimes at 30 yards and too low at 13 or 54 yards. Even so, you can make a lot of “kills” without knowing much of anything about ballistics. **[The distances and hold-over here depend on your gun, scope, and pellet. Don’t assume that any gun, scope, and pellet will shoot like this!]**

17. Ballistics (Easy Way)

If we want to be competitive or just apply our knowledge of ballistics, then we would like to improve our odds of making a “kill” throughout the entire range of distances. We can go to the range and get some basic information on our gun:

The first step is to shoot at targets spaced every 5 yards from 10 to 55 yards. Adjust your elevation so that you are hitting your aim point. Record the elevation (clicks) needed to hit the aim point at each distance. If you are going to use hold-over, do not adjust the elevation but record the distance between the aim point and point of impact.

You can then estimate the clicks for intermediate yards. Put this on a card you carry with you all the time while shooting (some people tape it to the stock or laminate and put on a lanyard). For the hold-over approach, find the highest point-of-impact (usually about 25 to 35 yards) and subtract that distance from all your measurements. Go to the range and zero your gun (aim point = point-of-impact) at that distance by using the elevation knob.

When shooting, the first step is to determine distance you are shooting. You then look on your card for that distance to find the hold over or the number of clicks. If you are using clicks, set the scope elevation knob to the clicks for the distance and shoot.

To make it easier to set/reset the elevation knob, most people will zero their rifle at the highest point of the pellet trajectory (usually about 25 to 35 yards). They will then set the elevation knob to “zero” (you will probably be up about 2 turns on the knob so this is not “absolute zero”). Now, when you adjust for targets closer than (say) 25 yards or further than (say) 35 yards (between 25 and 35 yards, the elevation setting will be zero in this example), all adjustments are “up.” This is a huge advantage in helping to remember where the zero is since all your adjustments will be one direction on the knob.

For example, let’s assume you have gotten the following information when shooting at 5 yard distances from 10 to 55 yards. Your clicks are all on the second turn and there may not actually be 100 clicks on a turn.

Distance	Clicks
10	249
15	234
20	215
25	211
30	210
35	211
40	213
45	216
50	220
55	224

You can see that from 25 to 35 yards there is not much difference in the elevation setting (and there is probably +/-1 click error in most cases, anyway). We can estimate the clicks for each yard between 10 and 15 by interpolation. [clicks per intermediate yard = (clicks at 10 yards – clicks at 15 yards)/5 or $(249 - 234)/5 = 3$ clicks/yard]. Thus, for 11 yards we estimate 249-3 or 246 clicks, 12 yards is 243, 13 is 240, and 14 is 237. This may not be absolutely the “truth” but it is good enough. In fact, a ballistics program’s calculations would be somewhat different because the trajectory is not really a straight line and other reasons. If you want to be more accurate, either shoot at more yardages or get a ballistics program to do the calculations for you.

18. Ballistics (Hard Way)

Ballistics of a pellet are based on the following parameters:

Speed of pellet

Ballistics Coefficient of pellet (drag)

Height of scope above barrel

In general, you can forget air temperature, pressure, and humidity as these are not major effects unless you shoot in Denver or Mexico City.

To get this information, measure the pellet speed a few feet from muzzle using a chronograph. (A Combro muzzle-mounted chronograph is \$65 -- <http://www.combro.co.uk/cb625.html>. Shooting Chrony chronographs are about the same but are “table” mounted.)

Measure the distance from the center of the barrel to the center of the scope.

Measure the speed drop of the pellet over 10 yards (2 chronographs required to do this well) or lookup Ballistics Coefficient (BC) in various places. The exact value is something we will adjust later so this is just to start the process.

Plug information into computer program to compute the clicks.

Scopeknob \$15 http://www.compufoil.com/product_sk.html

Chairgun \$0 <http://www.fotosoft.co.uk/chairgun/>

Chairgun Mobile \$20 <http://www.fotosoft.co.uk/chairgun/>

A-Team \$20 http://users.bestweb.net/~ateamray/ATEAB_program.htm

There are many others out there – many swear by the A-Team software. I bought the ScopeKnob program initially and have liked it well-enough to not try the A-Team program. For free, the Chairgun program is excellent – it just does not make as pretty a scope knob tape as ScopeKnob.

Yards	Clicks	Dir.	Hold(in)	Vel.(fps)	Drift(in)
10	39	Up	0.97	869.9	0.01
11	32	Up	0.87	867.5	0.01
12	26	Up	0.78	865.0	0.01
13	21	Up	0.69	862.6	0.01
14	17	Up	0.61	860.1	0.02
15	14	Up	0.53	857.7	0.02
16	12	Up	0.46	855.2	0.02
17	9	Up	0.40	852.8	0.02
18	7	Up	0.33	850.4	0.03
19	6	Up	0.28	848.0	0.03
20	5	Up	0.23	845.6	0.03
21	3	Up	0.18	843.2	0.04
22	3	Up	0.14	840.8	0.04
23	2	Up	0.10	838.4	0.05
24	1	Up	0.07	836.0	0.05
25	1	Up	0.04	833.7	0.05
26	0	Zero	0.02	831.3	0.06
27	0	Zero	0.01	828.9	0.06
28	0	Zero	0.00	826.6	0.07
29	0	Zero	0.00	824.2	0.07
30	0	Zero	0.00	821.9	0.08
31	0	Zero	0.00	819.6	0.08
32	0	Zero	0.02	817.3	0.09
33	0	Zero	0.04	814.9	0.09
34	1	Up	0.06	812.6	0.10
35	1	Up	0.09	810.3	0.11
36	1	Up	0.12	808.0	0.11
37	2	Up	0.17	805.7	0.12

Variables	
Velocity Retention Factor	0.972
Trajectory Factor	193
Muzzle Velocity	895
Zero Distance	28
Scope Height	2.18
Elevation Click Factor	0.25
Cross Wind Speed	1
Start Yards	10
End Yards	75

Quick Watch		Desired	
10	39	39	Σ
15	14	Near Yrdg.	
40	3		
55	14	Far Yrdg.	
55	14	14	Σ

The above came from ScopeKnob. Note that instead of BC it uses Velocity Retention Factor which is the ratio of the pellet velocity at 10 yards compared to 0 yards (or over any 10-yard distance). The .972 is for the JSB Exact Heavy pellets I use. The Trajectory factor is really a constant (gravity, etc.). Muzzle Velocity is measured with a chronograph. The Zero distance is settable but you usually adjust this so it is the same as the lowest click distance (so you have 0-clicks at the zero distance). Scope Height is not measurable to hundredths of an inch – the program can correct for the actual scope height if you tell it what your error is at about 10 yards. Click Factor is how many moments of arc your scope has at 100 yards – typically ¼ or 1/8. I like to plug in 1 mph for wind just for a reference – you never know the wind exactly so it is easier to have a rough knowledge of what wind will do to a pellet.

Go to range and shoot at zero click distance (top of the pellet arc) and zero gun.

Shoot at 10 yards and determine actual clicks to hit at aim point. This can be used to correct for scope height errors (and a measured distance is rarely exactly correct since the actual distance is from the center of the reticule to the centerline of the barrel).

Shoot at 55 yards and determine actual clicks to hit at aim point. This is used to correct for the VRF or BC – again, the published or measured number is rarely correct. The drag on a pellet is a complex function that is only approximately modeled by various equations. Drag is a function of speed and one way to adjust for various inaccuracies in the drag function is to adjust the pellet coefficient for drag.

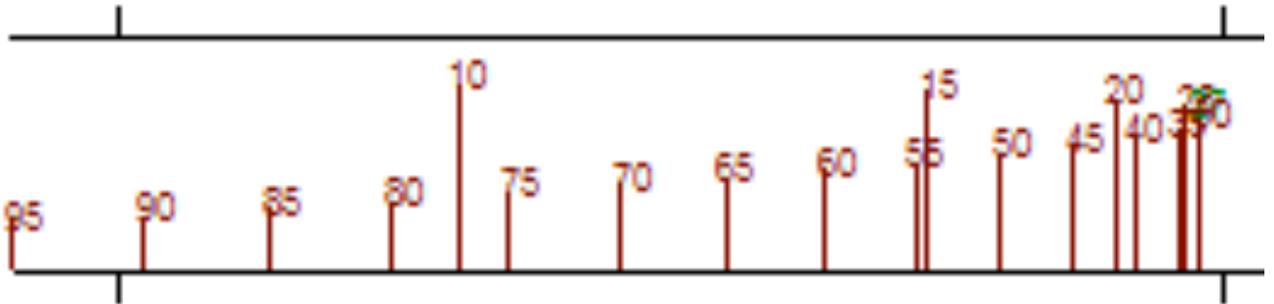
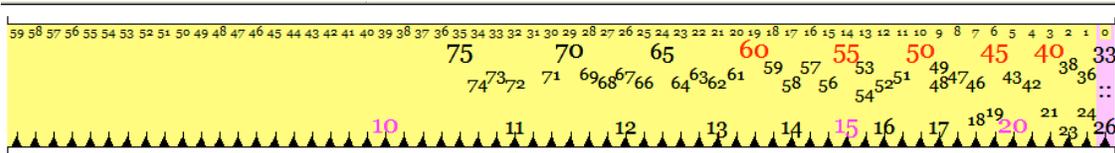
Adjust the ballistics coefficient/drag to correct for the 55 yard error. ScopeKnob does this automatically but all you need do is tweak the BC or VRF numbers so that the predicted clicks at 50 to 55 yards (whatever you shot at on the range) match what you saw.

Next, if using ScopeKnob or a program that can automatically do the calculations, adjust scope height to correct for the 10 yard error. If you are using Chairgun or a program

without this automatic feature – simply adjust the scope height so the predicted clicks at 10 or 11 yards (for example) match what you actually found on the range.

Go back to range and check again. (The easy way starts to sound better about now.) Usually, one or two interactions are enough. The most important factor is scope height since you will be shooting at a small hole and there is very little room for error. Basically, if your scope height is off by .125” then you will be shooting about 10 clicks off (if using 1/8MOA clicks) or 5 clicks if using 1/4MOA clicks – the distance will be the same – 1/8” and a probable miss if the kill zone is, say, 3/8”.

ScopeKnob, Chairgun, and A-Team software (among others) can produce a tape for scaling your elevation knob. While a large knob is better, even a small knob can be labeled although I suggest using a chart or labeling your distance as clicks if you don't have a large knob. Here is an example of a tape from ScopeKnob:



Similar tape from Chairgun (You get what you pay for!).

19. Wind

Ballistics can do a pretty good job of predicting the trajectory of a pellet. Good guns shoot at pretty much a consistent speed. Pellets can vary in weight but most are pretty consistent. The scope height is not going to change. Thus, the major things that can affect a pellet's trajectory are "under control."

One thing we cannot control is the wind. Ballistics programs can predict what will happen to a pellet with a given wind. The usual first instinct is to get a wind speed meter to measure the wind – unfortunately, the wind is not a constant in terms of velocity, position, or direction. Meters really only work well when the wind is at a constant velocity, the same along the entire pellet path, and from a constant direction.

Since we have to deal with this, let's look at what clues are available. A tell-tale on your gun (piece of yarn, for instance) will tell you what is happening at your gun to some extent. I find the feel of the wind on my face and the sound are good clues. If I can feel a breeze at all, I know there is about a 1 mph wind and I can judge whether it is from the left or right.

Other clues are the leaves, grass, and other movable things affected by the wind. The advantage of these is that they are located along the entire shooting path so that you can get clues as to the wind at the target and in between. Another clue is to hold up the reset string – if you sight along the string you can see if it is bowed to the left or right. It is difficult to "calibrate" the string but at least you have a clue as to the average wind direction along the entire pellet path.

Nothing works better than practicing shooting in windy conditions to learn what is going to happen to a pellet. You will always have cases where you guess wrong, but the more you shoot in varying conditions, the better your shooting will be. I force myself to shoot in windy conditions when many would deem it too windy to shoot well. When you have to hold-off a couple of inches at 50 yards to get a pellet in the kill zone, you will learn how to shoot well in most conditions.

When it is windy, shoot more shots at 30 to 55 yards. There are some wind effects at 30 or fewer yards, but unless the wind is "strong", the effects are going to be far more noticeable at 50 yards than at 30.

When you "don't have much of a clue" about the wind, one approach is to aim to the side of the kill zone. If you are pretty sure the wind is from the left but not much else, you can aim at the left edge of the kill zone and hope for the best.

You will tend to over-estimate the wind. The wind down at ground level where you are shooting is far slower than what is happening up in the tree-tops. You may hear lots of wind noise (and maybe the wind is 15 mph at tree-top level); down where you are shooting, I would doubt that the wind is likely to be more than 5 mph! Only by doing lots of shooting will you know what is really happening. Even then, some times it is really just a guess as winds in a tunnel of brush and trees might be one direction where you are sitting and the opposite direction at the other end where the target is located.

Wait for either a lull in the wind or a steady wind. It is hard enough to shoot (and estimate) in a steady wind but in gusty conditions all bets are generally off. Use your time at the firing line well – even if you have a timer there is often time to wait out the wind.

When you shoot in the wind, pull the gun a bit tighter against the shoulder and down against your arm or knee. This will keep the rifle from being blown around quite as much. A determined pull on the trigger is probably required – you may not be timing your pull all that much, but when you feel the time is right, make a determined effort to get off the shot. Wind is not a time to be a perfectionist – when you have a chance for a shot, take it!

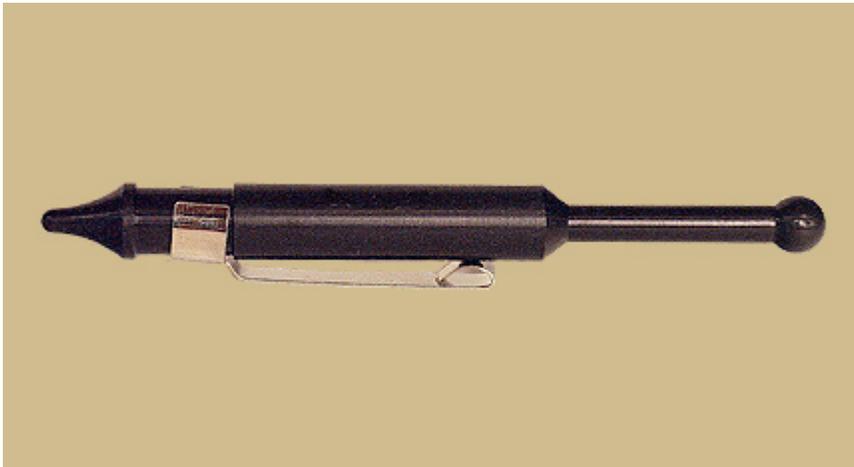
If you see a lot of hits off-center (or off the kill zone), you are probably seeing what the wind did to your fellow competitor's pellets. You can use that information to adjust your aim a corresponding amount toward the opposite direction (into the wind).

If you really want to see some numbers, here are the drift computations per mph for my Steyr:

Yards	Wind Drift (Inches)
15	0.02
20	0.03
25	0.05
30	0.08
35	0.11
40	0.14
45	0.18
50	0.22
55	0.27

20. Consistency = Success

Sounds trite but you really need to do the same things every time you shoot. It is very easy to get distracted and forget a step in your shooting preparation (like forgetting to load a pellet). Among the things I think are important are:



Always seat your pellets unless your bolt does this when you close it. Having the pellet in exactly the same position for each shot helps insure consistent pellet speed and probably smoothes out the skirts to help prevent fliers. I like the Beeman seater above – available for about \$15 anywhere that carries Beeman stuff.

Get into the habit of always following the same mental checklist. If you get interrupted, it is usually better to start over to make sure that every step has been taken. It is very easy to forget to set the elevation, for instance, if you are distracted during shot preparation. It is very easy to have your elevation knob off by one turn if you forget to return the knob to zero after every shot (or when leaving the lane).

Nothing will mess up your shooting faster than trying out too many things at one time. If you are making changes, make a change in one thing at a time so you can see what effect that change alone really has.

When you find a gun, pellet, position, etc. that works – don't mess around without a plan. Change for the sake of change is bound to lead to poor shooting.

Practice as much as possible and try to shoot even a few shots every day. (Sounds like your music teacher, doesn't it? Same things apply.)

21. Sitting Positions

Butt on bag (up to 6" thick and thicker may be better). I like a bean-bag fill since it conforms to the ground and your butt and is not bouncy. A boat cushion does not work – too slippery and bouncy. Some people like a short stool – often one set of legs is cut off a bit to allow the seat to be more level on uneven ground.

Various position variations are possible – the gun can rest on left knee or on top of left arm. I prefer the arm but try this and other variations to see what works best for you.

Similarly, the gun butt can rest on right shoulder or right knee (if you are very flexible). I tried the knee but ended up with a crick in my neck.

Wrap arms around knees or otherwise brace your position. This is harder to do in the rifle-on-the-knee position as seen below. I use a foam pad on my left arm to raise the rifle a bit and reduce the effects of my pulse on the rifle. I find that the cheapest knee pad at Home Depot works best for me – again anything that is “bouncy” will not work. You want a material that absorbs movement and is “lossy” – not like a Superball (which would be the worst possible material).



The essence of shooting well is to have your body as relaxed as possible while still maintaining your position. If you have to use major muscles to hold your position, you will induce shaking and it will be next-to impossible to shoot well. The “bible” on

shooting in my opinion is “Ways of the Rifle.” This is a 3-position .22 rifle sport but the information is very applicable to field target shooting. To summarize the approach:

Get into position and aim the gun. Get relaxed. When you think you are ready, close your eyes for several seconds. When you reopen them, note where the rifle is aiming. If your aim has shifted significantly, adjust your body position (don’t twist or use muscles to do this – move your position). Repeat until the aim point does not move significantly. You are now ready to shoot. Initially, this will take a few minutes but as you learn your position, you will speed up the process. It is still a good idea to check your position briefly before each shot.

Breath control is another major aspect of the shot. You will be holding your breath during the shot but if you hold your breath for too long, the body starts to think it is dying and you will begin getting shaky. The ideal is to take the shot from 4 to about 20 seconds after stopping breathing. To get to this, start with several full breaths (don’t hyperventilate). Before holding your breath, take a somewhat deeper inhale and exhale, inhale about a half-breath and exhale until you have about 20% of a breath. You are now ready to shoot.

The trigger position can be on the ball of the finger or closer to the knuckle. I prefer closer to the knuckle as I have better control. As in most things about shooting well – try variations and see what works best for you.

The shot is taken by aligning the sights and squeezing the trigger. If you jerk, you will “pull” the shot. Ideally, you don’t want to know when the shot is going to occur. This also allows you to follow-through on the shot – keep aiming and watch for the pellet hit. This will reduce the tendency for you to anticipate the shot and has the added advantage of letting you see what happened to the shot – if the wind threw the shot off, you can correct the next shot. If you can’t see where a shot hits, you don’t have a clue as to what will help improve the next shot.

Here is what http://www.smallbore.20m.com/smallbore_rifle/smallbore_rifle.html says about small-bore shooting (this was originally about prone shooting but I have modified it for the FT sitting position):

CONSTRUCTION OF THE FT SITTING POSITION:

GENERAL: The butt is in contact with the butt cushion and the feet are bracing the position. The low center of gravity of the body produces a very stable position. A perfect shooting position does not exist, but a general compromise of basic position procedures or tenets of construction do exist for the shooting shooter.

BODY The body is sitting with the trunk basically upright. The body points roughly 45% to the right of the lane so that the left knee and the right shoulder form a line to the target. The feet are in contact with the ground and are positioned approximately 120 degrees apart but relatively close to the body with the knees bent. If any part of the body is 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 of the sighted target kill zone. An upright body position allows one to breathe more easily and promotes good shooting.

The left arm on the left knee or the left knee supports most of the weight of the rifle. The right shoulder will support the rest of the weight (or the right knee – but then the weight distribution can be more like 50-50).

The left shin should be relatively vertical to promote as solid a support for the rifle as possible (bone to ground rule).

The right arm is wrapped around the right knee and is grasped lightly by the left hand to brace the body and knees into a single unit.

RIGHT HAND The right hand must not exert lateral pressure on the rifle stock but will pull the stock back against the shoulder for firm contact. 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 shooter will grip the rifle firmly and if the trigger pull resistance is low, the shooter will grip the rifle lightly (I like a firmer grip even with a light trigger pull as this reduces any effects on the rifle of trigger finger movement.). Always use identical pressure during competition. 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 inter 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 shooter 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 shooter as well.

HEAD POSITION The head position must be comfortable and relaxed. I prefer shooting off the shoulder since my neck is more relaxed.

BEHAVIOR OF WEAPON DURING SHOOTING In a steady relaxed position, the muzzle of the rifle will point at the target even when you close your eyes. If the aim point moves when you close your eyes, adjust your body position as necessary (but keeping as relaxed as possible) to adjust for the aiming error and retry closing your eyes.

22. Offhand Position

Construction of the standing or off hand shooting position

GENERAL It is said this is the most difficult of all the shooting positions. As a result of uneven ground, wind, 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 non-dominant mental control over the neuromuscular systems. The standing shooter must be able to use the non-dominant 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 shooter to stop body sway from one half to one second. During this brief period the body stops all movement and is as stable as the prone position. This is accomplished by the non-dominant mental entities direct control over the neuromuscular system. It is very easy to accomplish and as it can be used in every position including prone, there is no reason why you can't hit 75% or more of your offhand shots.

BUILDING THE POSITION (for right handed shooting) The standing position is established in the following manner. Feet pointing 80 to 90 degrees to the right of a reference line commencing from the target to the firing point. The upper body turns to the left about 1 to 4 degrees and the rifle firing across the shooters chest and pointing approximately 1 to 5 degrees away from the chest. The degrees specified are dependent upon the structure and build of the shooting shooter. Rifle and rifle stock forward of the pistol grip may not rest against the chest. Care must be 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. Generally speaking the shooter 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 a more 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. No 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 has been achieved. During this phase, the spine is compressed (slump down a bit) to finalize the body shooting structure.

HIPS As the body is leaning slightly backward, the hip is thrust forward a little, 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 rests on not less than three of the ribs. The amount by which the hip is moved forwards and the body is moved backwards will depend on the build of the shooter. An athletic person (wide shoulders, narrow hips) will move further back for example than a person with very slim hips. The hips are always level.

SPINE The spine generally holds the body torso together and forms a support structure for the torso. Within the athletic position the shooter 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 shooter trouble in that the shooter's endurance will be shortened during the stress and strain of the excessive twist and muscle restriction.

LEFT ARM The left arm is tucked 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.

KNEE The total weight of the left arm and rifle is supported by the left leg. The upper and lower parts of the leg is 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.

FOOT POSITIONING The feet will be in normal position with the feet not wider than the shooter's shoulders. A wider foot position will produce stress and is unstable for the shooter. The feet moved closer together will increase body vibrations and make it difficult to correct the overall balance. The shooter moves the weight mass on the balls of the feet in this manner. Sixty-five percent of the body weight is positioned on the ball of the foot and the remaining thirty-five percent on the shooter'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 portion of the standing position in that the shooter seldom uses shoes that will support the shooter's ankle and the position.

POSITIONING OF THE HEAD It is a well known the body 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 shooter. The competitive balance required by the shooter is controlled by the non-dominant mind and will last $\frac{1}{2}$ to $\frac{3}{4}$ of a second. The shooter must time the shot to occur in a two second or less one-shot match in each match shooting position during a competition.

NOTE FUNCTION: The shooter does not therefore lower the head onto the rifle but bring the rifle to the shooters head. The saying is bring the rifle to the head, never the head to the rifle.

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 has expelled the air to a point when the lung balanced and failing in its attempt to inhale or exhale.

RIGHT ARM The standing position, a good shoulder contact is important. But it is not always easy when the shoulders are almost parallel to the rifle stock for the hook or but assembly to be held securely under the arm or against the biceps and ball of the shoulder. Even with the shoulder pushed forward, the area of contact is not large enough.

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 as a result of the 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 this must be avoided at all costs. The 'hook' formed by the fingers holding the hand grip of the stock, and depending on the type of rifle, pulls 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 shooter. There are many different possible combinations of hand and finger positions.

NOTE: Possible left-hand grips during a match.

a. The palm of the left hand is turned forwards, the lower arm muscles are relaxed and the weapon is supported. This is not recommended as it places excessive strain upon the muscles and therewith restrict the abilities of the left arm during position construction and functional work.

b. The rifle is held with its weight directly supported by the forearm, palm facing toward the body and upturned with the rifle resting on the thumb ball joint. Arm muscles are again relaxed. As the rifle rest on the ball joint of the up turned palm, the shooters fingers are curved in contour of the stock without direct contact or griping by the fingers on the rifle stock.

Preferred method and currently used by World Class Shooters.

c. The weight of the rifle rests securely on the back of the hand, and thereby on the forearm. Palm is facing the body and the rifle is resting on the knuckles with the fingers pointing to the rear parallel to the rifle stock. This method is also not recommended to the shooting shooter.

PRESENTATION OF THE RIFLE IN THE STANDING POSITION

A problem arises in rifle presentation during the construction of the standing position. The big question by many shooting shooters is what is the rifle doing in relation to the body. We will review the possible methods used in placement of the rifle in the position.

1. The rifle is presented while using the shoulder pocket of the right shoulder. Such a use of the shoulder will make the rifle presentation point 3 to 15 degrees away from the chest and requires the body to twist excessively to the left in compensation for the rifle presentation of 3 to 15 degrees during position usage. The right arm will position itself along the left center of the ribcage.

2. The rifle is presented while lying across the chest while insuring the trigger hand and finger will not touch the body. This presentation of the rifle requires the rifle stock butt to be placed at the upper arm instead of the right shoulder pocket. The preferred method and one that is used successfully by current World Class Shooters. Care must be exercised when placing the left arm down outside the rib cage. The arm can slip during the firing procedure upsetting the rifle presentation and point of aim. In this case the butt hook is placed under the arm but not in the arm pit. The arm can be dropped to the side as a test to determine if the hook is positioned correctly without changing the rifle position or aiming point.

ADVANTAGES/DISADVANTAGES:

Item 1 has the ADVANTAGE of placing the left arm into a fixed position which has a buttress of muscles for preventing the arm from sliding or otherwise moving during the firing sequences. This method locks the left arm into location. The DISADVANTAGE is the rifle must point out and away of the shooting position causing stress and tensions on the shooting position. The procedure also increases the twist of the spine causing additional uncomfortable stress during shooting sequences. Item 2. has the ADVANTAGE of placing the left arm in one of two places on the rib cage, left center and left side rib cage. Additionally, the rifle is moved closer to the body thereby reducing the 3 to 5 degree rifle position away from the body and reducing the amount of spine twist required during the shooting sequences. The DISADVANTAGE is the rifle is closer to the body and the shooter must be careful not to violate the rules by allowing the rifle to touch the body in front of the trigger hand grip and the forward portion of the rifle. This also includes the trigger hand touching or being supported by any part of the body during the shooting competition. Otherwise this is the preferred shooting position of world class shooting shooters.

COMPETITIVE SHOOTING IS 98% MENTAL, 2 % PHYSICAL AND 100% SUPERIOR PERFORMANCE.

23. Kneeling

Construction of the Kneeling Shooting Position

Most FT shooters dislike the kneeling position probably because of lack of practice and the pressure on the ground knee. We relax the NRA rules and allow the ground knee to rest on the bum bag and are not as fussy about the right ankle placement and how vertical it is kept.

Taking the position: KNEELING

GENERAL As a general rule, the results of firing from the kneeling position will be as perfect and stable as the prone position. However, untrained shooters will find it very difficult at first to maintain their position during competition. Aching occurs in the foot, leg, and buttocks, which sometimes result in reduced concentration and less effective holding-aiming-firing sequence. Provided the position is constructed correctly, problems of this nature can be corrected during training. If the kneeling position is balanced and the neurophysiological system is used by the non-dominant entity, the Quiet Zone will appear for a brief period as the lungs become balanced. This period is normally $\frac{1}{2}$ to $\frac{3}{4}$ of a second long and then leaves. After a period of time the shooter will have to start the shooting sequence again as the Quiet Zone will not reappear until the shooter has again restarted the shooting position. How can a shooter prepare for the kneeling position? Simple, take the kneeling position in front the television without the rifle. While the shooter watches the TV program the leg muscles will stretch and ease the discomfort to the shooter. About a week of this and the shooter will be ready to shoot the perfect bull's-eye in the kneeling. Remember, the goal is to fire 6 one-shot matches (assuming 6 shots per lane and all shots are kneeling) resulting in perfect bull's-eye without a miss.

On the range the shooting shooter takes the position pointing 20 to 30 degrees to the right of target. 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 be accomplished. The natural point of aim is taken by assuming the kneeling position and looking through the thumb and index finger at the bull. The natural point of aim is seen as the black bull fills the space between the thumb and index finger. The left knee will also be pointing at the bull down range. The balance of the position and rifle fall into two lines of balance. The rifle balance starts at the central balance point at the front of the 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 a point of neck and shoulders, continuing on a direct line to the floor point half way between the right and left feet. The rifle balance line is a Sub-balance line of the main position balance line.

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 forwards and relaxed in their relationship to the backbone/spine, forming, as in the prone position, the shoulders at right angles to the spine/backbone.

NOTE FUNCTION: 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 shooter'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.

LEFT FOOT The left foot must be directly below the rifle and at an angle of 20 to 30 degrees to the right of target. 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. They are for shooting only and not walking. A second pair of shooting shoes will be used for training and may be scuffed and for walking around the range if the shooter wants. The match shoes must always be protected from damaged.

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

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 FT shooters don't normally have a kneeling roll but use the bum bag as a support. As long as the left foot and the right toe are in contact with the ground, that is usually a legal shot. There are no position police in FT (most of the time) so as long as you are reasonably kneeling, nobody is really going to care too much what you are doing with your right foot and ankle.

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 shooters 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 shooter.

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.

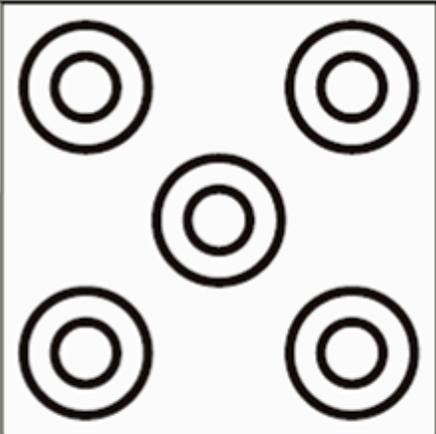
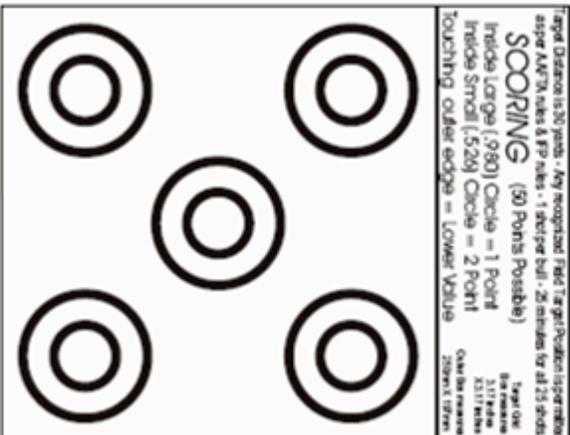
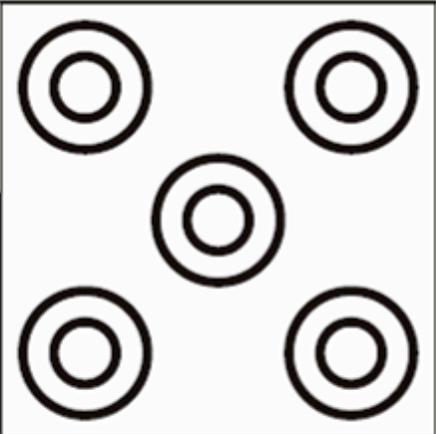
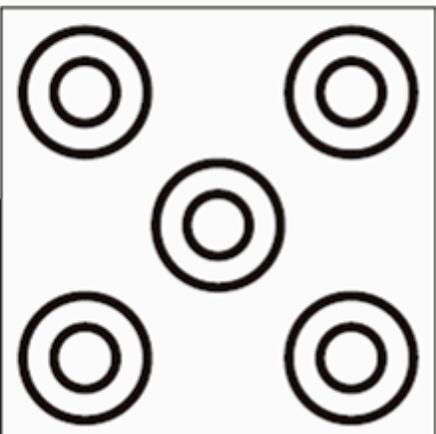
LEFT HAND The rifle stock rest on the ball of the thumb. The fingers are completely relaxed and do not touch the stock. All flexing of the hand muscles is to be avoided, as it can affect the steadiness of the position.

RIGHT ARM/SHOULDER It is the right arm, and thereby the right hand, that has the ultimate responsibility for firing and also 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 pistol grip stock with two middle fingers. The majority of the mistakes occur in the kneeling position because the shoulder is too high and in a cramp 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 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 arm pit.

RIGHT HAND The thumb of the right hand, without pressure being applied, rest 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 or lock 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'. As a result of the space between these points, the main weight lies within the triangle. In this way, the position has maximum stability. We acknowledge that every shooter varies a little. This is not a problem, as the shooter must adjust the rifle until the sighting path is clear through the rear sights. The shooter must remember the rifle movement (cant if any) cannot exceed 2 degrees without the movement changing the sights and sight zero. Normally, a cant is not required if the position is correctly established and the stock is correctly sized to the shooting shooter. 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.

24. IFP Targets

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<div style="border: 1px solid black; padding: 5px;">  <p style="text-align: center;">SIGHTERS</p> <p><small>Target Distance 10.30 yards - Any recognized Field Target Association except AAFTN rules & FP rules - 1 sighter ball - 20 minutes for all 20 shots</small></p> <p>SCORING (50 Points Possible)</p> <p><small>Target Size</small> Big (1.980) Circle = 1 Point Inside Small (.529) Circle = 2 Point Touching outer edge = Lower Value</p> <p><small>Big (1.980) Circle 2.17" (55mm) Outside Small (.529) Circle 2.09" (53mm)</small></p> </div> 	SCORE <input type="text"/> PRACTICE <input type="text"/>
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3 Shots per bull
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SCORING (50 Points Possible)

Inside Large Circle = 1 Point
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Touching outer edge = Lower Value

25. My Bookmarks

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General Information

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