



# **N. Z. D. A. Hutt Valley**

## **Rifle Matches – Course of Fire**

### **14 July 2014**

*(updated as of 20 July 2018)*

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## Introduction

The New Zealand Deerstalkers' Association (Hutt Valley Branch) Incorporated (N.Z.D.A. Hutt Valley) was incorporated on 12 February 1963, with the following principal objects – 'The formation, encouragement and advancement of the sport of deerstalking, bush craft, shooting and the like and to provide all members with facilities for the same'. We operate Kaitoke Range to provide basic firearm safety instruction and develop shooters who can operate and maintain their firearms in a confident, safe and proficient manner, both on the range and in the field. Competitive shoots—preferably in three or four positions—are vital components of the development process, as are our Hunter Training course and dedicated Coaching sessions, e.g. Riflemanship Development Courses for Scouts.

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## Updates from 1 October 2017

Revision and minor corrections. Page count reduced to 15 pages. *A Range Officer's Code, Black powder percussion firearms and Target set-up*; added to main document. Rimfire and Centrefire Double-match shoots to be scheduled consecutively on some days. Season starts on 1 September.

## Objectives

This course of fire is designed to:

- Provide rifle shooting competition for members of N.Z.D.A. Hutt Valley;
- Increase the average quality of positional shooting—as a critical step in riflemanship development—within the Branch Association;
- Minimise poor field shooting by Branch members;
- Assist recruitment of active members; and
- Prepare members for more demanding rifle competitions.

## Conduct

### Formal shoot

Shoots will be conducted as follows:

- Registration/Set up, Sight-in—as allowed;
- Briefing;
- Shooting, target changing, marking, rotation of details; and
- Pack-up and clean-up.

### Coaching and Practice

Following completion of the formal shoot we will run a coaching and practice session—subject to time constraints and weather conditions.

### Catering

Shooters should bring their own water and snacks. Hot drinks will sometimes be available but a thermos is recommended. The Branch BBQ is available.

# Administration, Etiquette and Personal Safety Equipment

## Range Safety Flag, Reporting and Registration

The Match Director (MD) will raise the—Union Jack Red, 1800x900mm—Range Safety Flag on the Range Flag Pole. All persons will report to the MD immediately upon arrival.

Shooters will register, paying Range Fees as follows: Senior \$5.00, Junior \$3.00. *Junior fee is 60% of Senior fee, rounded to nearest 50 cents. Special fees may apply for some events.*

All shooters who are under twenty-one years old (U21) on 1 September—start of our shooting season—are Juniors. Any novice shooter may shoot at reduced distances, subject to MD's consent; until the Shooting Competition Coordinator declares otherwise—results will be annotated accordingly. Registered shooters may use targets, backing boards and target holders, from the Target Shed, i.e. the N.Z.D.A. Hutt Valley container

## Firearm states, Firing-point and Ear/Eye protection

Firearms will be displayed and openly carried with actions open; and **ADEQUATE EMPTY CHAMBER INDICATORS** (ECIs) inserted, to **SHOW CLEAR**. Shooting, unless otherwise advised, will be from the main firing-point— the gravelled area—of Range One, Kaitoke Range.

All persons at and immediately behind the firing-point will use **ADEQUATE HEARING PROTECTION** i.e. earmuffs—Class 3 minimum—to be in good working order and condition. Class 2 protection, i.e. ear-plugs and ear canal caps, is non-compliant. Ballistic eye protection may be required with metal targets.

## Standard shoot timetable

	A.M.	All day	P.M.
<b>Setup</b>	08:15 onwards	08:15 onwards	12:15 onwards
<b>Registration and Sight-in</b>	08:30 onwards	08:30 onwards	12:30 onwards
<b>Start</b>	09:00 onwards	09:00 onwards	13:00 onwards
<b>Booked to</b>	12:00 noon	16:30	16:30

## Control

The Shooting Competition Coordinator will usually take the role of MD. The MD, also acting as Chief Range Officer (CRO) on the day, controls all activity on the Range; and reserves the following rights, as considered necessary:

- Handling and inspection of firearms and ammunition;
- Reclassification, penalisation and/or disqualification of shooters;
- Ejection of persons from the Range; and
- Banning of persons from the remainder of that shooting season's rifle matches.

The MD will wear a yellow High Visibility Vest.

## Delegation

The MD will delegate various tasks, such as shooter registration, range supervision, target-changing, target-marking and catering. Every delegate, whether a Registrar, Range Officer (RO), target-changer, Official Marker, or Catering Manager; is a representative of the MD and thereby, the Committee.

## Range Commands

These Commands are standardised for static rimfire/centrefire rifle matches and are adaptable to simulated-field shoots via addition of a Make-Safe Command. Use of Black powder—percussion—muzzle- and breech-loaders is covered on page 6.

### Range Open

The **RANGE** is **OPEN ... FIREARMS MAY BE HANDLED ON THE MOUND**. Shooters will bring firearms onto the mound, remove firearms from the mound and carry out adjustments and maintenance on the mound.

*Shooters who need to clean barrels or do other significant work on their firearms, should do so behind the mound, by their vehicles, to avoid inconvenience and delay.*

The **RANGE** is **OPEN**, you may **CHECK YOUR POSITION**. Shooters—at the firing-point—will bring their firearms to the shoulder and check their positions.

### Load and make ready

You may **LOAD AND MAKE READY**. Shooters will remove Empty Chamber Indicators, insert loaded magazines, load fixed magazines and chamber a round.

*Two (2) minutes will be allowed for fixed magazine rifles, otherwise one (1) minute.*

### Time allowance and command to Fire

This is a ... x shot match, you have ... x minutes to fire your shots. Is anyone not ready? ... you may **FIRE**. Shooters will commence firing.

### Cease Fire

**CEASE FIRE**. Shooters will cease firing, and wait for further instructions.

*Any shooter who discharges a firearm after the first word of this Range Command, is liable, at minimum, to forfeit their best shot and apologise to the firing detail for their conduct.*

### Unload

**UNLOAD** and **SHOW CLEAR**. Shooters will unload their firearms, work the actions to ensure that chambers are empty, insert Empty Chamber Indicators AND display their firearms for inspection—whilst continuing to point them downrange.

Range Officers (R.O.s) will inspect all firearms to ensure that they are completely unloaded AND release shooters from the firing-point.

### Range Closed

The Range Officer will confirm that no firearms are being handled on the mound, and call out **ALL CLEAR**, the **RANGE** is **CLOSED**. You may **GO FORWARD**. Target changers and shooters may then go forward to the butts.

No firearms may be handled anywhere on the mound, after the Range is closed ... until everyone is back behind the firing line and ... the Range is declared Open.

# A Range Officer's Code

by Michael Guerin ©2010

**1. Be** there as **the Range Officer** rather than everyone's friend.

**2. Provide the Example** of best Range-Safety practice, and when ignorant of safety rules—e.g. for black-powder muzzle-loaders—ask an appropriate person.

**3. Communicate** your safety decisions and preferences, to all persons at the Range—or individual sub-range—that you control; **and tell the truth** when explaining your reasons—or responding to any query.

**4. Delegate** Range-Safety supervision and other tasks—such as shooter registration—in order to regulate your workload and develop the competence of your assistants.

**5. Observe** in circumspect fashion **and encourage** good conduct at the Range.

**6. Take** direct **Control** as you consider necessary.

**7. Call** out **“CEASE-FIRE”** in order to reassert control, whenever Range-Safety appears to be compromised.

**8. Investigate** incidents **and act** promptly to evict unsafe persons.

**9. Document** all incidents on the Range **and report** Range-Safety offences as soon as practicable.

# Black powder percussion firearms

Black powder muzzle-loaders up to .75-inch calibre, equating to an approximate maximum projectile diameter of .775 inch; are authorised for use on Kaitoke Range.

## Safety precautions

The ignition system has not specified but for the purposes of any shoot held under the N.Z.D.A. Hutt Valley Rifle Matches – Course of Fire; and in accordance with NZ Black Powder Muzzle Loader rules, we advise that:

- Percussion-ignition muzzle-loaders may be used;
- Matchlocks, wheel-locks, snaphaunces and French—i.e. modern—flintlocks may not be used;
- All persons at the firing point will wear ballistic eye protection;
- Shooters will demonstrate via dropping their ramrod into the barrel that the firearm is unloaded, before they can be cleared from the firing point.

## Fire precautions

All reasonable precautions will be taken against fire and any fire quickly extinguished.

- Shooters will use phial charges only;
- A bucket of water and a sack will be placed at the firing point prior to commencement of shooting;
- No person may depart the firing point until a thorough check for possible burning patches has been carried out.

## Breech-loaders

Safety procedures for percussion breech-loaders such as the American Sharps and the British Greener ‘monkey-tail’ carbine are closer to those for metallic centrefire firearms but:

- ballistic eye protection is still required;
- and a damaged black powder cartridge can present a fire risk.

## Target set-up

### Target material

Paper and cardboard are standard materials for bull’s-eye and printed animal silhouette targets. Metal is restricted to reactive targets.

### Backers and fixing thereto

Targets are placed on backers which are put in target-holders. Container board is the ideal backer material for marking, carrying and storage but requires edge-supporting target-holders. Thin plywood is the best option with base support only—and especially in windy conditions—but causes ragged-edge bullet holes.

Paper **TARGETS WILL BE ATTACHED** to backers **WITH SHORT THIN-GAUGE STAPLES**, e.g. Rapid 13/4, **FOR SAFETY**. These staples are safer to remove when stripping backers and a 4mm leg length is fully adequate whilst posing the least handling risk. Practice targets may be affixed via self-adhesive tape. **DRAWING PINS MAY NOT BE USED.**

Self-adhesive targets may be used for practice shooting, either affixed to paper/cardboard targets or direct to backers; but will be placed with care so that projectiles are safely directed into bullet back-stops. It is easy to be distracted whilst affixing multiple aiming dots, squares, etc. to a target or target backer, thus creating a shooting hazard.

## HOLDERS

Target-holders will be made of timber, with the least possible number of steel fasteners. Base-supporting target-holders sit flat on the ground and have sufficiently wide slots for easy fitting/removal of backers. Wedges can be used to secure backers.

## REACTIVE TARGETS

Ballistic safety glasses will be used. Metallic silhouette/disc targets will be sited in approved fashion, and at safe distances from firing points. Shooters will use correct firearms and ammunition for rimfire and centrefire targets. Targets will be made from steel of appropriate grade, thickness and hardening—and be in safe, useable condition. Pendulum targets are preferred for rimfire and centrefire shooting.

Air rifle targets are often made solely for use with air pistols and low-power .177 air rifles. Gamo seems to be the only company providing practical guidance for safe use of its metallic targets and pellet-stop target holders. Pendulum-style, swing-aside and knock-over air rifle targets will be used in conjunction with the manufacturer's instructions—where available—and common sense.

**Improvised reactive targets such as aerosol cans, television sets and liquid containers—empty or full—may not be used on Kaitoke Range.**

## SAFE TARGET PLACEMENT

Targets will be placed in front of—and close to—bullet backstops, neither above nor below them; and as stated above, reactive targets will be placed at safe distances from firing points.

## TRUE SHOOTING DISTANCES

Distance from shooter to target—when shooting from behind the red line—increases, respectively:

- from 25 metres to 30 metres;
- from 50 metres to 55 metres; and
- from 100 metres to approximately 107 metres.

The variance with the longest quoted target distance is due to the significantly greater task of maintaining and repairing the main butts' area, i.e. it is not worth the trouble of ensuring that targets are placed exactly 100 metres from the main firing point. A minimum distance to target of 100 metres is satisfactory for competitive shooting.

# General Match Rules

## Format design

The formats in this Course of Fire are designed to develop and maintain practical marksmanship skills; and to encourage ethical shooting in the field. There is no offhand component in the .22 Rimfire 75m Shoot, because:

- the area bounded by the solid 8-ring on the 50m target is suitable for practising Offhand headshots on small game, e.g. rabbits, hares and possums;
- BUT the 8-ring on the 100m target—as used in this shoot—is double the diameter, quadrupling the total area; and
- Offhand headshots on small game are typically attempted at 30m or less, although a practised expert shot might be competent out to 50m or more—in ideal conditions.

Practice makes permanent, but ... it has to be the right kind of practice (NZ Army).

## Shooting positions

Except where allowed in individual match formats, all positions are unsupported.

### Prone

**Unsupported** Lying on stomach, both hands supporting rifle.

**Supported** Lying on stomach, both hands supporting rifle, forearm and hand supported by a filled sandbag or improvised rest, subject to shoot rules.

### Sitting

**Unsupported** Standard field shooting position—open-leg sitting, to dedicated target shooters—sitting at front of firing point, both hands supporting rifle, feet forward of timber edge and below backside, body at angle to target.

### Kneeling

**Unsupported** Forefoot flat on ground, back knee on ground, ball of back foot on ground, both hands supporting rifle. *The so-called Olympic kneeling position—i.e. a sitting position—is not allowed.*

**Supported** As above but leaning against—and possibly with arm around—a tree or post.

### Offhand

**Unsupported** Standing, with body at angle to target, both hands supporting rifle.

**Supported** Standing, with elbows supported—as in a 300m foxhole style firing point at a military range—both hands supporting rifle.

## Shoot-off to decide first place

Where shooters have tied for first place—and a single winner is required—they will reshoot the most challenging part of that shoot, as follows:

- in the .22 Rimfire 75m Shoot, they will reshoot the kneeling match; and
- in a regular Double-match shoot they will reshoot the 2P rapid-fire match.

## © Match targets

N.Z.D.A. 50m red with double bull's-eye and central sight-in dot.  
N.Z.D.A. 100m or 200m red with single bull's-eye and inner ring;  
N.Z.D.A. 200m red target centre OR special targets, as and when required. 1

## Scoring

Shots will be scored according to bullet-hole diameter (2) and location on the target. Total score for each target will be calculated and transferred to the pertinent detail sheet.

### Inward-gauging

We use the traditional inward-gauging method, e.g. when a shot:

- falls between the boundaries of the 10- and 9-rings it is scored as a 9;
- straddles the boundary of the 10- and 9-rings, it is scored as a 10;
- straddles the boundary of the inner ring—100/200m targets only—it is counted as an *inner* and the shot is scored as a 10.1, also called a *possible*.

### Gauging tools 2

Holes in paper targets may shrink after the shot, requiring use of a bullet-diameter —mechanical— gauge to see if the bullet has touched or broken a ring. Mechanical gauging will be subject to the MD's discretion and will be indicated next to a bullet-hole by the markings T-in / T-out, according to result. Double-gauging will be indicated by a double T mark.

### Overloads

An overload occurs where too many bullet holes appear on a target; and is treated as follows:

- if you overload on your own target you forfeit your best shot or shots, as applicable;
- if you overload on another shooter's target you forfeit the overloads; and the Match Director determines which shots are attributed to the other shooter.

### Scoring on reactive targets

Each shooter will have a spotter, to observe target reaction and record the appropriate score.

### Aggregates

Each shooter will achieve individual positional scores and total match scores. Shooters who stay the course will achieve a Double-match score, to be credited for an annual Class Aggregate, as below. Shooters who do not stay the course will be listed as '*Did not finish*' (DNF) and will not achieve a placing. An annual Class Aggregate will comprise a shooter's three (3) best Double-match total scores for the season.

#### **.22 Rimfire Double-match Classes**

Open  
Hunting Match  
Light Sporter

#### **Centrefire Double-match Classes**

Open  
Sporting Rifle  
Suppressor-equipped Rifle

### Awards

Issue of certificates and returnable or one-off trophies is at the discretion of the N.Z.D.A. Hutt Valley Committee. Spot prizes may be issued for special events.

### Footnotes

1. Representative animal targets, e.g. N.Z.D.A. Wilkinson target, etc. OR reactive targets.
2. False scoring, i.e. scaling up or down of bullet holes to 8.015mm diameter, is not allowed.

## Season opener and standard shoots

### **.22 Rimfire Rifle – Positional @75m – Season opener – September 1** 3P, 30-shot, slow-fire

- Positions** <sup>2,3</sup> Prone, Sitting and Kneeling.
- Shots** 10 in each position, plus 2 optional non-counting sighters in prone position.
- Time** 2, 10, 10 and 15 minutes.
- ☉ **Target** ☉ N.Z.D.A. 100m red, single bull's-eye with inner ring.
- ✍ **Scoring** ✍ Inward gauging. <sup>4</sup>
- Equipment** All Classes. See Rifle, Ammunition and Equipment Schedule – .22 Rimfire.

*The 100m bull's-eye target is effectively one third (1/3) larger at 75m. Good for rusty shooters!*

### **.22 Rimfire Rifle – Positional @50/25m<sub>1</sub>**

3P, 30-shot, slow-fire @50m

- Positions** <sup>2,3</sup> Prone, Sitting and Kneeling.
- Shots** 10 in each position, plus 2 optional non-counting sighters in prone position.
- Time** 2, 10, 10 and 15 minutes.
- ☉ **Target** ☉ N.Z.D.A. 50m red, double bull's-eye and central sight-in dot.
- ✍ **Scoring** ✍ Inward gauging. <sup>4</sup>
- Equipment** All Classes. See Rifle, Ammunition and Equipment Schedule – .22 Rimfire.

2P, 10-shot, rapid-fire @25m

- Positions** <sup>2,3</sup> Offhand and Kneeling.
- Shots** Five 2-shot sequences—1 offhand shot followed by 1 kneeling shot. Shooters start with cartridge chambered and rifle held at low port.
- Time** 30 seconds for each 2-shot sequence.
- Target, Scoring and Equipment as above.**

*This rapid-fire match is the next-best thing to a Running Boar match, for teaching rifle fit.*

### **Centrefire Rifle Positional @100/50m <sup>1,5</sup>**

3P, 15-shot, slow-fire @100m

- Positions** <sup>2,3</sup> Prone, Sitting and Kneeling.
- Shots** 5 in each position, plus 2 optional non-counting sighters in prone position.
- Time** 2, 5, 5, and 7 minutes.
- ☉ **Target** ☉ N.Z.D.A. 100m red, single bull's-eye with inner ring.
- ✍ **Scoring** ✍ Inward gauging. <sup>4</sup>
- Equipment** All Classes. See Rifle, Ammunition and Equipment Schedule – Centrefire.

2P, 10-shot, rapid-fire @50m

- Positions** <sup>2,3</sup> Offhand and Kneeling.
- Shots** Five 2-shot sequences—1 offhand shot followed by 1 kneeling shot. Shooters start with cartridge chambered and rifle held at low port.
- Time** 30 seconds for each 2-shot sequence.
- Target, Scoring and Equipment as above.**

## Roar Shoot – February or March <sup>1, 4</sup> Centrefire Rifle Positional @75m and 100m

Offhand, 5-shot, rapid-fire @75m

<b>Positions</b> <sup>2, 3</sup>	Offhand.
<b>Shots</b>	5.
<b>Time</b>	2 minutes.
🎯 <b>Target</b>	🎯 N.Z.D.A. 200m red, single bull's-eye with inner ring.
✍️ <b>Scoring</b>	✍️ Inward gauging. <sup>4</sup>
<b>Equipment</b>	Sporting Rifle and Suppressed Rifle only. Maximum scope power/setting of 4x. See Rifle, Ammunition and Equipment Schedule – Centrefire.

2P, 10-shot, slow-fire @100m

<b>Positions</b> <sup>2, 3</sup>	Prone and Sitting.
<b>Shots</b>	Five in each position. No sighters.
<b>Time</b>	5 and 7 minutes.
🎯 <b>Target</b>	🎯 Deer silhouette.
✍️ <b>Scoring</b>	✍️ Inward gauging with transparent template.
<b>Equipment</b>	As above.

### Footnotes

1. See the latest N.Z.D.A. Hutt Valley Shooting Calendar. Rimfire and Centrefire Double-match shoots will be scheduled consecutively on some days. Season starts on 1 September.
2. See *Shooting Positions*.
3. See *Format Design*.
4. See *Targets, Scoring, Aggregates, Awards* on p. 9.
5. No shoots at Easter.

## Prospective Shoots

N.Z.D.A. Hutt Valley is willing to test new competitive rifle formats and add them—on an annual or biennial basis—to this Course of Fire. A selection of possible formats is listed below.

- .22 Rimfire prone shoot, using steel silhouette targets
- .22 Rimfire simulated-field shoot, subject to venue availability
- 17 Rimfire magnum varmint-themed shoot, based on .22 Rimfire Open Class rules;
- Centrefire 200m positional slow-fire shoot, using bull's-eye and special targets; and/or
- a Centrefire positional slow-fire shoot where the shooter starts with a scope and changes to iron sights partway through a match, possibly reattaching the scope to complete that match.

Older matches may be updated and reintroduced.

## Shooting Tips by Michael Guerin

### Dry-firing

Dry-firing practice is useful for all shooters, and particularly so if the rifle is rarely used. There are two good reasons to dry-fire a rifle before a shooting match or hunt, firstly: to ensure that the shooter is reacquainted with the rifle and trigger; and secondly: to ensure that the trigger mechanism is working as smoothly and consistently as possible when a live round is discharged.

For rimfire dry-firing practice:

- use fired cases from that rifle; OR
- buy and use plastic snap caps.

For centrefire dry-firing practice;

- load bullets into several old or random cases that have been resized and deprimed, and put some epoxy in the flash holes to resist firing pin impact; OR
- buy and use commercial snap caps.

### Rifle fit

Practise dry-firing and live-firing in several shooting positions, especially offhand snap-shots which are particularly challenging for shooters who prefer to practise their shooting in prone and/or bench-rest positions. Adjust scope height/position and length of pull to suit. When trying scope ring-mounts—rings—on a rifle, put tape on the action/bases, attach the rings, close your eyes, bring the rifle to your shoulder, open your eyes and see if you are looking through the centre of both rings, repeating several times. You can then try a different set of rings, without scratching anything.

If your hand does not close properly on the pistol grip OR the grip is too large, modify the grip, replace the stock or pick another rifle. Do the same if your trigger finger goes too far into the guard or if you can barely touch the trigger with your hand placed firmly on the stock. Ensure that the fore-end works for you.

### Stock shape

Many rifles made for the U.S. market are fitted with lightweight prone stocks, sold as American Classic style. These stocks can work reasonably well, from prone or sitting positions and they save manufacturers money, because the wooden versions use less wood; and the synthetic versions require smaller moulds; than actual hunting stocks.

Shooters can adapt these rifles for general use by changing the pitch of the butt from 90 degrees to the barrel axis to approximately 70 or 80 degrees. This is done by bringing the lower part of the butt pad forward, to provide full shoulder contact when shooting. This reduces pivoting of the rifle when it is fired so that the unsupported top of the butt pad cannot rock back and slam painfully into the shooter's shoulder. A better fit also increases accuracy. **NB** If what you have works well for you, I suggest that you leave it alone.

### .22 Rimfire

A 2-7x variable—OR quality 4x—sighting telescope will be a good initial choice although a 3-9x / 3.5-10x—OR a quality 6x with parallax set for 75 yards—might be better for hunting rabbits, hares and pest birds. Cheaper scopes may be supplied with heavier reticles, to draw the eye to the centre and distract the shooter from distortion at the edge of the image OR poor overall clarity.

**Standard subsonic velocity** 40gr .22 long rifle ammunition—with average factory-tested velocity of 1,035-1,080 fps at sea level—**is best for accuracy**. So-called standard velocity rounds have an average velocity of approximately 1,150 fps at sea level, making them supersonic at the muzzle and less accurate—in windy conditions—from about 30 metres onwards. Bullet drop for standard subsonic ammunition, between 50 and 100 metres is—in my experience—typically 8 M.O.A. from a 22-24" barrel and 9 M.O.A. from a 16" barrel. Do your own test!

## Centrefire

Any decent low-power variable—OR quality 4x—sighting telescope will be a good initial choice for hunting and range practice. If you choose a 6x scope for general hunting use, have the parallax reset to 75 yards. Shooters may obtain better scores if they load for typical hunting distances, rather than for targets at 500- to 1,000-yards.

## Sights in general

Set the reticle focus on your scope before attempting to zero your rifle. When using a variable for dusk or dawn shooting, select the magnification which gives the brightest image. You can find that setting by looking through the scope at dusk, varying the magnification until you have the brightest possible image for the available light.

Burn out the fluff in a peep backsight with a cigarette lighter—old target shooting trick.

Extra light in the bush is far more useful than a few extra millimetres of accuracy. Take the threaded eyepiece out of the backsight before you go bush hunting.

## Adjustment values and verification

One minute of angle/arc (M.O.A.) = 1.0472 in. @100 yards or 29.09mm @100 metres. Precise values are useful for calculating sight mounting options but—when shooting—it is generally easier, to use imperial adjustments at metric ranges if you assume that 1 in./M.O.A. @100 yards= 28mm @100 metres, ½ M.O.A. = 14mm @100 metres and ¼ M.O.A. = 7.0mm @100 metres.

Where a shooter is making frequent use of scope—or iron sight—adjustments, it is worthwhile calculating adjustment values in millimetres at several ranges e.g. 25, 50, 75 and 100 metres for a rimfire and 50, 100, 150 and 200 metres for a centrefire rifle and verifying the manufacturer's nominal adjustment values by shooting the rimfire at 50 metres OR the centrefire at 100 metres.

Best quality scopes will have exact adjustment values. Very good scopes will either have exact—OR slightly larger than advertised—adjustment values. This is probably because the machine cutting tools were more consistent when cutting to a slightly higher value.

Durability aside, just as optical clarity is more important in a scope than brightness, consistency of adjustment is more important than precise adherence to nominal adjustment values. Shooters should verify values by shooting, adjusting, measuring and recording.

## Buy and use a notebook.

### Sight-in with N. Z. D. A. bull's-eye targets

Each ring on an N.Z.D.A. bull's-eye target is approximately equivalent to half a minute of angle (½ M.O.A.) when the target is placed at the designed distance from the firing point. Zeroing adjustments—via target ring—are as follows:

#### Corrective values on N.Z.D.A. bull's-eye target at designed range

Minute of angle	Portion of ring	millimetres	Portion of ring
1/8 MOA	One quarter of a ring		
		5mm	One third
¼ MOA	Half of a ring		
		10mm	Two thirds
1/3 MOA	Two thirds of a ring		
½ MOA	One ring		
		15mm	One ring
		20mm	One and a third
1 MOA	Two rings		

## Rifle, Ammunition and Equipment Schedules – .22 Rimfire

<b>Chamberings</b>	.221.r. and .22 W.M.R, etc.		
<b>Ammunition</b>	To be of correct type and in safe, useable condition. Tracer may not be used. .22 W.R.F. may be used in .22 W.M.R. chambers.		
<b>Classes and Maximum rifle—examples</b>			
	<b>Light Sporter <sup>1</sup></b>	<b>Hunting Match</b>	<b>Open</b>
<b>Bolt-action repeater</b>	Anschütz 64 Sporter, Brno 1, 2 & 5; CZ 452/455; CBC 122.2; JW15, Marlin 880SQ, etc.	JGA 64R Biathlon & 54 Sporter; CZ 452/455 Varmint; Weihrauch HW 66 Jagd-Match, etc.	Any rifle.
<b>Self-loading</b>	Brno 511 & 611; Marlin 7000, Ruger 10/22 Carbine & Rifle; Weatherby Mk XXII, etc.	Rem. 597 LS Heavy Barrel, Ruger 10/22T, T/C 22 LR Classic Benchmark, etc.	Any rifle.
<b>Other</b>	Lever-/Slide-action and single-shot rifles similar to above.		Any rifle.
<b>Loading methods <sup>2</sup></b>	Magazine-feed for repeaters/self-loaders—minimum four (4) round starting load. Single-shot rounds will be carried on the rifle, e.g. in a quick-loader OR on the shooter's person.		All OK.
<b>Triggers, bolt handles, knobs, etc.</b>	Shoes, polishing and alternative parts OK. Sear-engagement bolt-action triggers replaceable with fully adjustable triggers.	Alternative triggers including 10/22 trigger guard units OK. Special bolt handles, knobs and cocking handles OK.	
<b>Cocking test</b>	Rifles will be in good working order and condition; and pass a rigorous cocking test—upon demand.		
<b>Stock</b>	Altered length of pull, eased pistol grip, rebalancing and barrel floating OK.	Custom stock incl. thumbhole OK. Butt plate height-adjust only. Super-low fore-end not allowed.	All OK.
<b>Maximum scope power/setting <sup>3, 4</sup></b>			
<b>50m – Slow 25m – Rapid</b>	4x	6x	All OK.
<b>75m</b>	6x	9x	All OK.
<b>100m</b>	9x	14x	All OK.
<b>Iron sights <sup>4</sup></b>	Open OR peep backsight with blade/bead/combo foresight.		All OK.
<b>Lasers</b>	NO LASERS. Batteries to be removed from laser-equipped scopes.		
<b>Same rifle—and attachments—will be used for the whole shoot.</b>			
<b>Muzzle brake</b>	NO MUZZLE BRAKES.	Essentially useless but OK.	
<b>Suppressor</b>	OK on shortened barrel, if total-fitted length is less than original.		All OK.
<b>Barrel weight</b>	No barrel weights.		All OK.
<b>Bipod</b>	NO BIPODS.	Legs folded forward whilst shooting.	
<b>Sling</b>	A two-point sling may be attached but not used for support.		All OK.
<b>Clothing and other gear <sup>5</sup></b>	Practical gloves and shooting mats allowed. Kneeling rolls OK for slow-fire. No shooting jackets/gloves/trousers/boots, etc.		All OK.

## Centrefire

<b>Chamberings</b>	As authorised for Kaitoke Range—but may be restricted for specific matches.	
<b>Ammunition</b>	To be of correct type and in safe, useable condition. Hunting, target and military full metal jacket ammunition OK. Armour-piercing, tracer and modified military projectiles may not be used.	
<b>Classes</b>		
	<b>Sporting Rifle and Suppressed Rifle <sup>6</sup></b>	<b>Open <sup>7</sup></b>
<b>Configuration <sup>7</sup></b>	Rifle will look, in the Match Director's opinion, like a sporting rifle. A standard military service rifle may comply.	Any rifle.
<b>Loading methods</b>	Magazine-feed for repeaters/self-loaders—minimum three (3) round starting load. Single-shot rounds will be carried on the rifle, e.g. in a quick-loader OR on the shooter's person.	All OK.
<b>Triggers, etc.</b>	Trigger shoes, polishing and alternative springs/hammers/triggers OK. Speed-lock kits and special bolt handles/knobs OK.	
<b>Cocking test</b>	Rifles will be in good working order and condition; and pass a rigorous cocking test—upon demand.	
<b>Stock</b>	Slip-on butt pad may be used.	All OK
<b>Maximum scope power/setting <sup>2, 3</sup></b>		
<b>100m– Slow 50m – Rapid</b>	6x	All OK.
<b>200m</b>	12x	All OK.
<b>Parallax</b>	Fixed parallax	All OK.
<b>Iron sights <sup>4</sup></b>	Open OR peep backsight with blade/bead/combination foresight.	All OK.
<b>Lasers</b>	NO LASERS. Batteries will be removed from laser-equipped scopes.	
<b>Same rifle—and attachments—will be used for the whole shoot.</b>		
<b>Muzzle brake</b>	NO MUZZLE BRAKES. Switchable brakes to be taped in off position.	
<b>Suppressor <sup>6</sup></b>	Not allowed for Sporting Rifle but a quick-detachable (QD) suppressor is OK for Suppressed Rifle. <sup>6</sup>	All OK.
<b>Barrel weight</b>	No barrel weights.	All OK.
<b>Bipod</b>	No bipods.	Legs forward.
<b>Sling</b>	A two-point sling may be attached but not used for support.	All OK.
<b>Clothing and other gear <sup>5</sup></b>	Practical gloves and shooting mats allowed. Kneeling rolls OK for slow-fire. No shooting jackets/gloves/trousers/ boots, etc.	All OK.

## Footnotes

1. Light Sporter Class is intended as a 'happy hunting ground' for competent teenage shooters.
2. Some .22 WMR rifles only have a four (4) round magazine.
3. Many 4-12x and 6-18x rated scopes have minimum magnifications of 4.4x and 6.5x, respectively.
4. Sight restrictions may be increased—or relaxed—for special shoots, e.g. the Roar Shoot.
5. Gloves suited to routine shooting activity, i.e. load/shoot/unload, stoppage drill, sight adjustment, field stripping and cleaning. Fabric/rubber work gloves, with tips removed, are an option.
6. Identical to Sporting Rifle except for QD suppressor.
7. Centrefire varmint rifles are restricted to Centrefire Match Open class.