

Seddon Range Ammunition and Energy Testing Procedure

1 December 2025

The range certification for Seddon Range is subject to maximum muzzle velocity of 1000 m/s and a muzzle energy limit of 4500 joules. A table is provided below listing the maximum muzzle velocities for various projectile weights to reach the muzzle energy limit.

NRANZ needs to demonstrate that reasonable efforts are being made to ensure that shooters are not using ammunition exceeding the approved safety limits.

Past procedures to test velocity using a first generation LabRadar proved to be unsatisfactory due to attempts to use the device outside its recommended operational parameters, performance limitations with the device, and the large size of the device that proved a distraction to the shooter.

Second generation doppler radar devices such as the Garmin Xero are now available in a much smaller size and with simpler operation and greatly improved and reliable performance.

The objective of this document is to outline a testing procedure that is credible, fair, and indisputably assesses the ammunition being used during competition. It is essential that the procedure is conducted in a manner that does not distract or inhibit the shooter during their match shooting.

Random testing will be carried out at the 2026 National Championship meeting using the procedure described below.

TR NRANZ Rules

T2.21. Ammunition may not be used which is forbidden under specific rules provided for in Range Regulations.....(This includes velocity and energy limits for Seddon Range)

F/O – F/TR ICFRA Rules

F2.20. Ammunition....must meet in all respects the limitations of any range regulations (e.g. calibre, velocity, muzzle energy etc).... (This includes velocity and energy limits for Seddon Range)

Velocity Checking

A small form factor doppler radar chronograph such as the Garmin Xero C1 Pro, or Athlon Rangecraft will be used to check velocity and energy. For clarity, a LabRadar V1 will not be used as past experiences have found it unsuitable for NRANZ requirements.

Before the commencement of a match string the CRO or CRO delegate will place a chronograph near the rifle muzzle in a location that does not obstruct the shooters sight lines to the wind flags. Generally, on the right of the barrel for a right handed shooter and on the left of the barrel for a left handed shooter has proven to be out of the shooters sight lines. The CRO or delegate will also remove one round of ammunition from the shooters ammunition box and place in a plastic Ziploc bag marked with the shooters name for subsequent disassembly and weighing of the projectile. The display screen of the chronograph will be masked from the shooter to comply with ICFRA rules T2.8.1 and F2.19.1 and prevent any distraction to the shooter.

The shooter will then complete their match string of sighting and counting shots. The complete match string will be deemed to be a representative sample of the shooters ammunition. If the chronograph does not record all the shots fired in the sample, or records more shots than were fired in the sample the results of the check will be invalid and a deemed pass result will be given.

Once the CRO has indicated an intention that a shooters match string will be tested the shooter may elect to the CRO that their string is not to be counted for match score. If the shooter so elects then shot scores and position will not be signalled in manual marking, and if electronic marking is in use the shooters display screen must be placed face down, until the completion of the test and the target is cleared. At the completion of the 10 shot test, and provided the result is a pass, the shooter will immediately proceed with their counting match string.

A sample size of at least 10 shots when calculating the mean and SD is required to ensure a meaningful result. If the chronograph does not record 10 fired shots the test will be deemed a pass and the shooters ammunition will not be retested.

A shooter's ammunition will be deemed compliant with the velocity limits provided that for a sample of at least ten recorded shots the average velocity plus twice the standard deviation of the sample is less than or equal to the maximum velocity for the projectile weight set out in the table below, i.e. for compliant ammunition $\text{Average MV} + 2\text{xSD} \leq \text{Maximum MV}$

e.g. If the SD is 10 fps, $2\text{xSD} = 20$ fps, the Average MV should be less than 3084 fps if 155gn projectiles are used (Max 3104 fps).

This formula ensures that at least 97.5% of a shooters ammunition is expected to be below the limit based on a normal distribution of velocities.

If $\text{Average MV} + 2\text{SD}$ is calculated greater than the permitted limit the shooter will be warned that the sample indicates their ammunition is likely to be exceeding the limits and may be subject to additional checking.

In the event of the chronograph recording within the sample a muzzle velocity above the maximum allowed for the projectile in use **and** the average MV +2SD exceeds the velocity limit, the ammunition will be considered to fail the limits test and the CRO will be informed.

In the first instance of breaching the limit there will be no penalty. The competitor will be given the opportunity to acquire complying ammunition to complete the competition. They shall use complying ammunition for all remaining competitions under penalty of disqualification.

A shooter may challenge the result of the velocity check and request a retest using the same methodology during the shooters next match. If requested by the shooter an alternate device will be used if available. A second failure of the velocity check may result in disqualification.

Ammunition checking

NRANZ Shooting Rule: T8.13. The RO or another range official who has been delegated by the CRO is authorised to check that the ammunition used by a competitor is within the specification for the match. One round from those that the competitor is about to fire may be taken for subsequent examination. The competitor should not be disturbed once they have commenced firing.

After dismantling the round for checking, the unfired cartridge case and bullet must be returned to the competitor.

Maximum Muzzle Velocity for Projectile Weights:

Projectile Weight (gn)	Max Velocity m/s	Max Velocity f/s	Muzzle Energy Joules	Muzzle Energy Ft/lb
80	1000	3280	2592	1911
90	1000	3280	2916	2150
105	1000	3280	3402	2509
130	1000	3280	4211	3106
140	996	3268	4500	3318
150	962	3156	4500	3318
155	946	3104	4500	3318
155.5	945	3100	4500	3318
160	931	3054	4500	3318
170	904	2966	4500	3318
180	878	2881	4500	3318
184	869	2850	4500	3318
185	866	2843	4500	3318
190	855	2805	4500	3318
200	833	2733	4500	3318
210	813	2667	4500	3318
215	794	2606	4500	3318
220	776	2545	4500	3318
230	757	2485	4500	3318
240	739	2424	4500	3318
250	720	2363	4500	3318