



Rifles, Calibres and Land

Advice for Enquiry Officers

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N.B. In preparing this advice it has been necessary to cater for readers who have little or no prior knowledge of the subject. We apologise in advance to those who already have some knowledge and might feel that, like their Grandmothers, they are being taught to suck eggs.

1. The Cartridge; rimfire or centrefire.

As a result of wide-ranging experiments in the early days of breech loading firearms, we are left today with the two systems of ignition which proved to be most suitable from the points of view of efficiency in use and ease of manufacture. These are **rimfire** and **centrefire**.

Only five common cartridges still retain the rimfire method of ignition. These are the .22, (widely used in both pistol and rifle,) the .17 Hornady Magnum Rimfire, the .17 Hornady Mach 2, the .22 Winchester Magnum Rimfire and the 9mm shotgun. Rimfire cartridges are easily recognisable because the head of the cartridge (the end opposite the bullet) is smooth and flat. The priming compound is contained in this flat head and is ignited when the rifle's firing pin crushes the rim of the case against the rear of the barrel's chamber.

Centrefire cartridges have a separate primer, or percussion cap, inserted centrally in the case head. The common 12 bore shotgun cartridge is an example of the centrefire method of ignition.

Many early cartridges in all sorts of calibres were developed on the rimfire principle because of its ease and cheapness of manufacture. However, it has two major drawbacks.

First, the brass case represents over half the total cost of a rifle cartridge, which is a considerable cost in larger calibres and rimfire cases cannot easily be reloaded and re-used; and

Second, in order to achieve reliable ignition, the brass head of the case must be quite thin. This means that it will not stand the high pressures generated by modern cartridges. To get this into perspective, a .22 R/F develops about 20,000 Pounds per Square Inch (PSI) of pressure in the breech of the rifle. Most modern centrefire rifle cartridges produce over 50,000 PSI.

2. Which Calibre?

In Britain the quarry may be as small as a rat or as large as a red stag. Ranges at which the shot is taken may also vary from a few yards to over 300, depending on circumstances.

The "right" calibre is very much a matter of individual choice. One calibre is no "safer" or "more dangerous" than another. Suitability for a particular purpose is largely a matter of opinion. As long as an applicant's choice meets any minimum requirements there are no public safety implications in the use of a larger calibre. IT IS THE CALIBRE OF THE MAN WHICH IS IMPORTANT - NOT THE CALIBRE OF THE RIFLE.

There are some commonly accepted conventions in choice of calibre. These are set out below.

a) Rabbits and other small quarry. The **.22 Rimfire (R/F)** is almost universally used for rabbit shooting. It is powerful enough to ensure a humane kill without damaging the carcass so as to make it unattractive in the market. It is not sufficiently powerful for the humane shooting of foxes unless the range is very short - 50 yards or less - and circumstances allow the bullet to be placed with great precision.

The rifle will usually be fitted with a **sound moderator** (often erroneously called a "silencer"), and used with "sub-sonic" ammunition. This is ammunition designed to propel the bullet at just below the speed of sound (about 1100 feet per second), thus avoiding the sharp crack of super-sonic bullets and making the moderator much more effective.

More about sound moderators later.

There is also a .22 R/F cartridge which produces twice the energy of the standard Long Rifle round. This is the **.22WMR (Winchester Magnum Rimfire)**. Despite the similar name, the two cartridges are *not* interchangeable. In an accurate rifle this cartridge is useful where rabbits must be shot at ranges of 100 yards or more and it is also sufficiently powerful to be a humane choice for fox control as long as shots are not taken beyond about 100 yards.

The recently-introduced .17 rim fire calibers (HMR & HM2) are a good choice for shooting rabbits and other small pest species at longer ranges; it is at its best when used beyond about 90 to 100 yards, and it complements the .22 R/F which is preferable for shorter ranges.

b) Fox, hare, feral cat and similar. From here on, all cartridges will be **centrefire** and the bullets they fire will be jacketed since lead would strip off in the rifling at the higher velocities unless protected by (usually) a copper jacket. Either a hollow point or an exposed lead nose ensures that the bullet expands on impact and thus transmits the maximum of energy to the target for a sure, clean kill.

There is a plethora of **.22 centrefire cartridges** firing bullets of about the same size as the .22R/F but at much higher velocity. Those usually encountered in Britain are, in ascending order of power, the **.22 Hornet**, the **.222 Remington**, the **.223 Remington** (which is the same as the 5.56mm Nato cartridge) and the **22/250 Remington**. Very occasionally you may come across a **.220 Swift**.

You may also meet or be asked about the **.17 Remington** which fulfills the same function using a lighter bullet of around 20 grains weight at about 4000 feet per second muzzle velocity.

Don't be fooled by the names; all but the .17 Remington fire bullets of .224 inch diameter. Bullet weight in the .22 calibres may range from 40 to about 70 grains. (There are 437.5 grains to the ounce and 7000 grains to the pound).

Velocities range from about 2600 feet per second (FPS) to almost 4000 FPS and it is a matter of individual choice as to which cartridge may be most suitable for the intended purpose.

They are all suitable for fox control. All but the .17 Remington and the .22 Hornet are legal for use on Roe deer in Scotland; *but not (at time of writing, 1999), for any Deer in England and Wales.*

It is worth noting at this point that applicants may well have a "good reason" to acquire rifles chambered for different .22 centrefire cartridges. The most powerful are useful where shots may have to be taken at over 250 yards but their extra cost and increased muzzle blast (noise) may mean that one of the less powerful cartridges is preferable where ranges are shorter or human habitations are close by.

An applicant who does a lot of pest control may even need two rifles firing the same, or a closely allied, cartridge so as to be sure of having a rifle available if one is out of service for any reason. There is also the matter of having one light, portable rifle for shorter ranges, and a heavier one with (say) a bipod and a heavy barrel for longer ranges.

c) Deer control. This would also include the occasional applicant who may wish to shoot wild goats or boar in those areas of the Country where they are present.

The Deer Act 1991 stipulates a minimum calibre and minimum muzzle energy of .240" and 1700 ft/lbs for the lawful shooting of all Deer species in England and Wales except for only Chinese Water Deer and Muntjac, where a minimum bullet weight of 50 grains, minimum calibre of .220 inches and minimum muzzle energy of 1000 ft lbs applies. Scottish legislation is slightly different and includes a minimum velocity requirement; there are two sets of ballistic minima, one specified for all deer species and a reduced requirement for Roe deer only.

(We occasionally hear the word "**overkill**" used by members of the Licensing Authority when a certificate holder has applied for a rifle of a certain calibre. The word is inappropriate. "Overkill" is calling in an air strike to obliterate a village because there is a sniper in the church tower. It has no place in civilian rifle shooting. From the perspective of the target animal the rifle can hardly be too powerful provided the rifleman can shoot it accurately.)

The next smallest Deer commonly encountered, the Roe Deer, is likely to weigh twice as much as a Muntjac and a Red Stag may be 15 or even 20 times heavier. Larger and more powerful cartridges firing a heavier bullet of greater diameter are generally appropriate for Fallow, Red and Sika deer and are *definitely* required for the shooting of wild boar.

3. Are some calibres more "dangerous" than others?

Those unfamiliar with the physical characteristics of rifle cartridges are often concerned that a cartridge with a large and impressive sounding name will be much more powerful and therefore in some way much more dangerous. This is simply not true, and there are three very good reasons why it is not true.

First, no responsible rifleman will take a shot before ensuring that his bullet, after passing through the target, will embed itself safely in the ground. With such discipline being fundamental to the use of sporting rifles in the field, the calibre of the rifle is of no importance whatever.

Second, on the very rare occasions when a high-velocity bullet may ricochet it will be deformed, unstable and therefore unlikely to travel very far. It's kinetic energy decays very quickly. This is broadly the same for all calibres used for hunting in Britain. Hunting bullets, unlike the military full metal jacket types, are designed to deform and expand on contact with even the soft skin and flesh of an animal.

Third, experiments established that a bullet fired vertically into the air will reach a height of about 9000 feet in 19 seconds before falling back to earth in another 36 seconds or so. The falling bullet only has remaining velocity at that point of some 300 fps. This is about the velocity of a pellet fired from an air pistol though the energy would be greater because of the greater weight of the bullet.

4. Sound Moderators.

There often appears to be an unfounded fear of sound moderators. They are seen, perhaps, as the tool of either poacher or assassin. One can only say that should such gentlemen require "silencers" they would be unlikely to apply to the police for permission to acquire them!

Setting such groundless fears aside, there are several excellent reasons why an applicant may wish to reduce the noise made by the discharge of a rifle. For that is all that a sound moderator does; it has no other function; **it merely reduces the "boom"** of the discharge. This benefits the ears not only of the shooter (who is nearest to it) but also those of other people in the vicinity and the much more sensitive ears of nearby livestock. This is particularly so at night when much rabbit and fox control takes place.

A moderator may also be appropriate for deer control either in a park or close to human habitation where disturbance is best kept to a minimum.

The nearest approach to actual silence is when a moderator of very high quality is fitted to a .22 R/F rifle firing low powered ammunition at below the speed of sound (approx 1100fps). Sound moderators cannot reduce the supersonic crack caused by the flight of high velocity bullets.

In some situations, quite apart from any benefit to the operator, **it may be an act of social responsibility to fit a sound moderator to a rifle.**

N.B. A rifle which incorporates an *integral* sound moderator does not need a specific variation granted by the Licensing Authority.

5. Land checks.

This is a subject which probably causes more ill-feeling and frustration for both applicant and police than any other aspect of the licensing process.

It is BASC's firmly held opinion, supported by the findings of the Firearms Consultative Committee, that checks to see if a particular area of land is suitable for the use of a rifle of a particular calibre are a waste of time. It is the user of the rifle who is "safe" or "unsafe"; not the rifle itself; and certainly not the land.

However we seem to be stuck, for the moment, with the unsatisfactory system of assessing land for suitability. An Enquiry Officer, presented with the duty of signing a report to say that a certain piece of land is "safe", tends to err on the side of caution. This, while understandable, is no help whatever to the applicant needing to control rabbits, foxes or deer on that land and is seen as ridiculous when one considers that another rifleman, with an "open" certificate, may quite properly shoot there.

We feel that it would save a great deal of stressful confrontation if reports on land were worded along the following lines:

"The land at..... extends to some acres and is bounded on the west by a busy A class road and on the north by the lane from to There are two public footpaths crossing the land and a bridleway runs across the north-east corner; none are very much used. The village of lies just over a mile to the south-west etc etc. The land is of a rolling nature, with many areas where a line of fire would present a safe backstop. A sensible person could use a rifle quite safely on that land provided that care was taken to ensure that safe backstops were identified and that anyone using the neighbouring roads and rights of way was not endangered or alarmed."

It is also a cause of widespread discontent that Home Office Guidance on land checks is never followed. Section 13.13 of that Guidance advises that, **"When land inspections are required, the knowledge and experience of local shooters, stalkers, gamekeepers etc. should be drawn upon."** In the 10 years (Feb 1999) that George Wallace has been Firearms Officer for BASC he is aware of very few instances in which this advice has been followed. It leaves a very bad impression both on BASC and, more importantly, on your customers if land is seen to be refused unreasonably.

6. Conclusion.

BASC's wish and purpose is to assist the easy and efficient working of the firearms legislation both for the benefit of our own members and for that of the licensing authority. We have no more desire than you to see firearms in the wrong hands but will not tolerate unreasonable difficulties being put in the way of legitimate certificate holders. The job is fairly simple if we work together but can be very difficult if we don't.

In a leaflet such as this we can only skim lightly over what is a fairly complex technical subject. Please remember that BASC is there to help you with tricky problems in just the same way as we help our Members. We have no axe to grind and our advice will always be accurate and objective. If a problem arises with which you feel we can assist then please pick up the telephone.

George Wallace, February 1999. (Updated April 2009)

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