



## Calibres, bullets and velocities

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This article has come about because of questions from Field Guides regarding the minimum calibre that is legally allowed for guiding.

This minimum calibre is loosely defined by FGASA in their Trails Guide manual. However, they are not the authority on making this a definitive statement. In years past, the minimum calibre allowed for hunting dangerous animals in Zimbabwe was declared as 375H&H. Prior to that the 9.3x64 was regarded as the minimum calibre allowed.

In South Africa there are several government departments, hunting organisations and other entities who also often “declare” the minimums for use on dangerous or large animals.

We will look at other issues that can assist in making this decision as there is no single answer to the minimum calibre when all the options are considered.

### Calibre

Definition:

*“In guns, particularly firearms, caliber (or calibre; sometimes abbreviated as “cal”) is the specified nominal internal diameter of the gun barrel bore – regardless of how or where the bore is measured and whether the finished bore matches that specification. It is measured in inches or in millimetres. In the United States it is expressed in hundredths of an inch; in Great Britain in thousandths; in Europe and elsewhere in millimetres. For example, a “45 calibre” firearm has a barrel diameter of roughly 0.45 inches (11 mm). Barrel diameters can also be expressed using metric dimensions. For*

*example, a "9mm pistol" has a barrel diameter of about 9 millimetres. Due to the fact that metric and US customary units do not convert evenly at this scale, metric conversions of caliber measured in decimal inches are typically approximations of the precise specifications in non-metric units, and vice versa.*

*In a rifled barrel, the distance is measured between opposing lands or between opposing grooves; groove measurements are common in cartridge designations originating in the United States, while land measurements are more common elsewhere in the world. Measurements "across the grooves" are used for maximum precision because rifling and the specific caliber so-measured is the result of final machining process which cuts grooves into the rough bore, leaving the "lands" behind."*

### Velocity

Definition:

*"Muzzle velocity is the speed of projectile (bullet, pellet, slug, ball/shots or shell) with respect to the muzzle at the moment it leaves the end of a gun's barrel (i.e. the muzzle). Firearm muzzle velocities range from approximately 120 m/s (390 ft/s) to 370 m/s (1,200 ft/s) in black powder muskets, to more than 1,200 m/s (3,900 ft/s) in modern rifles with high-velocity cartridges such as the .220 Swift and .204 Ruger."*

### Bullet

Definition:

*"A bullet is a kinetic projectile, a component of firearm ammunition that is shot from a gun barrel. The term is from Middle French, originating as the diminutive of the word Boule (boullet), which means "small ball". Bullets are made of a variety of materials, such as copper, lead, steel, polymer, rubber and even wax. Bullets are made*

*in various shapes and constructions (depending on the intended applications), including specialized functions such as hunting, target shooting, training and combat. Bullets are often tapered, making them more aerodynamic. Bullet sizes are expressed by their weights and diameters (referred to as "calibers") in both imperial and metric measurement systems. For example: 55 grain .223 caliber bullets are of the same weight and caliber as 3.56 gram 5.56mm caliber bullets. Bullets do not normally contain explosives (see Incendiary ammunition and Exploding bullet), but strike or damage the intended target by transferring kinetic energy upon impact and penetration (see terminal ballistics)."*

### Penetration

Bullet penetration is regarded as specific to the application the bullet or ammunition is designed for.

When we talk in terms of self-defence, a soft nose, expanding bullet is preferred to ensure maximum damage to stop the threat.

When we talk in terms of guiding, a bullet used to stop the charge of a dangerous animal, such as a buffalo or elephant, a heavy calibre, solid bullet designed for straight-line penetration is preferred.

The problem for the guiding industry is that because it is not an industry that is specifically catered for by ammunition manufacturers nor, in the case of South Africa, even in the firearms legislation. Guides are then presented with a problem where they go to a firearm dealer or gun shop and ask for ammunition. They are most often given two choices, both of which are specific to the hunting industry, namely, soft-nose or solid ammunition. Bullets on these rounds are usually round nose in design.

The round nose bullet design is largely made for the hunting industry where animals are shot from distance, ambushed or when the

animal is facing sideways or obliquely to the shooter. Hunters are not always interested in the “one shot kill” and more concerned that even though the animal runs for some distance, it will stop when it succumbs to its injuries caused by the damage caused by the bullet. It is very rare that the animal is shot in a full-frontal charge situation.

Guides on the other hand, are trained to avoid confrontation by animals and rather view from a respectable distance and leave without the animal even knowing they were being observed. In the instance when an animal is disturbed or is aware of the guide or guests and then confronts the guide, the guide may have to resort to shooting that animal in self-defence. In that instance, the animal may be in a full charge but will most often be coming directly towards the guide and the guests. This is when a one-shot kill is imperative to stop the animal “in its tracks”. So firstly, only solid or monolithic bullets should be considered. After this bullet construction and design is critical!

Round nose bullets tend to veer off course simply because the round nose coming into contact with harder material, such as flesh and bone, can simply deflect the bullet.

It has been a subject of many bullet manufactures over the past few years, to develop a solid bullet that can continue to travel in a straight line even after hitting flesh and bone, particularly that of large animals such as buffalo or elephant. This is where the flat nose bullet design has come to the fore.

One of the very first people who came up with this idea was Bjinse Visser who designed, engineered, and produced DZOMBO bullets. These are regarded by the guiding industry as the premium bullet for this industry. He shows graphically that a DZOMBO bullet versus a round nose bullet, the same calibre and fired through the



same rifle, penetrated an impressive 3metres while the round nose bullet penetrated just over 1 metre and deviated alarmingly from its original point of entry.

Now DZOMBO monolithic bullets are no longer the only ones produced with flat noses and Federal is now producing ammunition loaded with a flat nose bullet.



Another recognised ammunition manufacturer is HORNADY, who have also started producing flat nose bullets in their product line.



Another South African bullet manufacturer that supplies flat nose bullets is BUHRR who market their bullet as having a 14% angle rather than an ogive as in other bullets. I am sure there are others.



Figure 1 - BARNES



Figure 2 - NOSLER



Figure 3 - BUHRR

Whichever bullet is chosen, the most important issue to address is feeding in the rifle you use. Many shooters do not use flat nose bullets because of problems with feeding. This is a concern but is easily resolved by contacting a reputable gunsmith with the rifle and ammunition (preferably loaded as dummy rounds) and they can alter the feed ramp to accommodate these rounds.