



## **New Rifle Barrel “Running In”**

*In simple terms, a rifle barrel is a tube of steel with a set of parallel grooves, called rifling, running the length of the bore in a spiral. When a rifle is fired, the bullet travels up the barrel where the rifling “cuts” into the bullet forcing the bullet to spin at the same rate as the spiral. Once the bullet leaves the barrel, axis spin gives the bullet stability (and therefore accuracy) in flight.*

*New rifle barrels require being “run-in” to prepare the surface of the barrel for optimum performance.*

*All barrels are machined from solid metal that either has to be distorted or cut to shape when being manufactured. These processes result in a surface finish to the bore and rifling which may too rough to allow the bullet to slide along without dragging off some of the bullet material and causing it to stick or “weld” to the bore. Occasionally these processes (particularly the button forming method) can result in a finish to the bore and rifling which can be too smooth. Even in this case some of the bullet material can end up stuck to the bore by what is known as “friction welding”, which occurs when two extremely smooth surfaces of metal rub together. This material that sticks or welds to the barrel is called metallic fouling and is the prime cause of poor accuracy in new or nearly new barrels. Metallic fouling not dealt with through a proper running in procedure will ultimately ruin a brand new barrel. It will increase and build up in thickness in an irregular manner. These patches of fouling will cause damage to the surface of the next bullet as it passes and may even cause upset between the jacket and the lead core if severe enough.*

*At the junction of the chamber and bore, the throat is the parallel area immediately in front of the case mouth. This is where the exposed part of the bullet sits just prior to firing. Just ahead of the throat is the leade, a tapered area where the throat diameter reduces down to the groove diameter and onwards to the bore diameter. When the rifle is fired, the bullet impacts the leade and is squeezed down in diameter and into the shape of the grooves. In new barrels, the throat and leade have often quite rough surfaces as a result of the rotary motion of the chamber cutter, known as the reamer, which has been used to create them. The marks are radial which is at right angles to the bullet movement. This can be very detrimental to accuracy and needs to be smoothed or polished out so as not to damage or upset to bullets movement and to allow a consistent force to apply all around the bullet whilst it is being squeezed down in diameter. If the throat and leade are not polished through a proper running in procedure the bullet may either be damaged or end up titling slightly as it is forced into the bore resulting in uneven flight of the bullet once it has left the barrel and a wide dispersion of the shots.*

*A proper running in procedure will prevent or at least greatly reduce the likelihood of these problems from occurring and will bring the barrel up to its optimum performance as quickly as possible. In running in the barrel, the throat and leade become polished and metallic fouling will be far less likely to occur at any time later during the life of the barrel.*

### **Running in Procedure**

*The most commonly used method to run-in a new barrel is to “shoot and clean” as follows:*

*Shoot 1 shot and clean (chamber and barrel and dry out)*

*Shoot 2 shots and clean*

*Shoot 3 shots and clean*

*Shoot 5 shots and clean*

*Shoot 5 shots and clean  
Shoot 10 shots and clean  
Shoot 10 shots and clean*

*for a total of 36 rounds. Use ammunition from a single batch similar to the type of ammunition that you intend to use for future shooting.*

*Note:*

- 1) Be aware that jacketed bullets can have either “gilding metal” jackets or “steel” jackets. The former is the more common and are softer and nearer to pure copper. RG, Sierra, Lapua and most competition bullets are of this type. The “steel” jackets are made of a copper coated malleable steel (Tombac) and are slightly harder. This type of jacket is found in Norma, Russian and German military, and other military bullets. Whilst not detrimental to an already run-in barrel they should be avoided for running in of a new barrel.*
- 2) There are two principle types of propellant powder used in rifle cartridges:
  - a) Extruded – which is used in most high quality or competition ammunition. The powder looks like little rods or tubes and leaves a soft fouling residue on the barrels after each shot that is easier to clean.*
  - b) Ball – which is used by many other military ammunition makers (being inexpensive to make and easy to load at speed). It looks like tiny ball bearings of various sizes with the larger balls looking slightly flattened. It burns hotter than most extruded powders and leaves a hard fouling residue on the barrel wall, which is more difficult to clean, and may require more rigorous cleaning.**

*Do not mix extruded powder ammunition and ball powder ammunition without cleaning between the use of the two different types, otherwise further and more complex fouling problems can occur.*

*It is strongly recommended that the barrel be run in and used with gilding metal bullets and extruded powder for both easier running in and a longer accurate life for the barrel. Make sure to always clean the rifle VERY thoroughly prior to changing to a different type of ammunition during the life of the barrel. Failure to do so will result in severe fouling difficulties as a result of the interaction between the different fouling residues left behind by each type of ammunition.*

*Once the barrel has been successfully run-in, regular cleaning should occur after approximately every 40-50 rounds. The risk of metallic fouling is still very high up to about 150-200 rounds fired so it is important that attention is paid to any signs of it occurring, usually experienced by the opening up of a group or random stray shots that fall outside the group. Adhering to a cleaning after every 40-50 rounds fired is strongly recommended during this period. After the 200 rounds fired mark, it is possible to increase the number of shots before cleaning, but regular cleaning should always be part of the routine.*

*A well run-in barrel made of 416 stainless steel should give a top accuracy life of about 4,500 – 5,500 rounds after which time the groups will start to open up usually forming a hollow pattern. This life can be longer for high chromium content barrels, such as 17/4 stainless steel, up to around 8,000 – 10,000 rounds.*