.22 Long Rifle ammo at AmmunitionStore.com

.22 Long Rifle .22 Long Rifle - Subsonic Hollow point (left). Standard Velocity (center), Hyper-Velocity "Stinger" Hollow point (right). Rimfire cartridge **Type** Place of origin United States **Production history** Designer J. Stevens Arm & Tool Company Designed 1887 **Specifications** Parent case .22 Long Case type Rimmed, Straight **Bullet diameter** .222 in (5.6 mm) Neck diameter .226 in (5.7 mm) Base diameter .226 in (5.7 mm) Rim diameter .278 in (7.1 mm) Rim thickness .043 in (1.1 mm) Case length .613 in (15.6 mm) Overall length 1.000 in (25.4 mm) Rifling twist 1-16" Rimfire Primer type **Ballistic performance** Bullet weight/type Velocity Energy 40 gr (3 g) Solid^[] 1,080 ft/s (330 m/s) 104 ft·lbf (141 J) 38 gr (2 g) Copper-plated $\mathrm{HP}^{[]}$ 1,260 ft/s (380 m/s) 134 ft·lbf (182 J) 1,430 ft/s (440 m/s) 141 ft·lbf (191 J) 31 gr (2 g) Copper-plated HP^[] 1,750 ft/s (530 m/s) 204 ft·lbf (277 J) $30~{\rm gr}~(2~{\rm g})$ Copper-Plated ${\rm RN}^{[1]}$ 32 gr (2 g) Copper-Plated $\mathrm{HP}^{[1]}$ 1,640 ft/s (500 m/s) 191 ft·lbf (259 J)



The .22 Long Rifle rimfire (5.6×15R – metric designation) cartridge is a long established variety of ammunition, and in terms of units sold is still by far the most common in the world today. The cartridge is often referred to simply as .22 LR ("twenty-two-/'ɛl/-/'ar/") and various rifles, pistols, revolvers, and even some smoothbore shotguns have been manufactured in this caliber. The cartridge originated from the Flobert BB Cap of 1845 through the .22 Smith & Wesson cartridge of 1857, and was developed by the American firearms manufacturer J. Stevens Arms & Tool Company in 1887^[2] by combining the casing of the .22 Long with the 40-grain (2.6 g) bullet of the .22 Extra Long. For many decades, it has been a very popular cartridge around the world. It is one of the few cartridges that are accepted by a large variety of rifles, as well as pistols. The .22 Long Rifle and related cartridges (.22 Short, .22 Long and .22 Extra Long) use a heeled bullet, which means that the bullet is the same diameter as the case, and has a narrower "heel" portion that fits in the case.

Popularity

Low cost, minimal recoil, and relatively low noise make .22 LR an ideal cartridge for recreational shooting, initial firearms training, small-game hunting and pest control. Used by Boy Scouts for the rifle shooting merit badge, .22 LR is popular among novice shooters and experts alike. The rimfire round is commonly packaged in boxes of 50 or 100 rounds, and is often sold by the *brick*, a carton containing either 10 boxes of 50 rounds or loose cartridges totaling 500 rounds, or the *case* containing 10 bricks totaling 5,000 rounds.

A wide variety of rimfire ammunition is available commercially, and the available ammunition varies widely both in price and performance. Bullet weights among commercially available ammunition range from 20 to 60 grains (1.3 to 3.9 g), and velocities vary from 575 to 1,750 ft/s (175 to 530 m/s). Promotional loads for plinking can be purchased in bulk for significantly less cost than precision target rounds. The low cost of ammunition has a substantial effect on the popularity of .22 LR. For this reason, rimfire cartridges are commonly used for target practice.

The low recoil of the cartridge makes it ideal for introductory firearms courses. Novice shooters can be surprised or frightened by the recoil of more powerful rounds. Beginners shooting firearms beyond their comfort level frequently develop a habit of flinching in an attempt to counter anticipated recoil. The resulting habit impedes correct posture and follow-through at the most critical phase of the shot and is difficult to correct. With high recoil eliminated, other errors in marksmanship technique are easier to identify and correct.

AR-15 upper receivers and M1911 slide assemblies are available for this round. CZ Model 75 handguns also have a fixed barrel upper pistol conversion kit to make it shoot .22 ammunition. These rimfire conversions allow shooters to practice inexpensively while retaining the handling characteristics of their chosen firearms (with reduced recoil and muzzle blast). Additionally, .22 conversion kits allow practice at indoor ranges which prohibit high-power rifles. The 'fun factor' of shooting a high powered pistol converted to low energy .22 rounds is cited among the reasons for the conversion kits, in addition to lower ammunition costs. Owners of guns that use gas systems, such as AR-15 sport style rifles, normally avoid firing non-jacketed .22LR ammunition, as the use of unjacketed ammunition may lead to fouling of the gas port inside the barrel and costly gunsmithing procedures.

Annual production is estimated at 2–2.5 billion rounds. [3][4]

Performance

Performance varies between barrel length and the type of action. For example, Bolt action rifles may perform differently than semi-automatic rifles. .22 LR is effective to 150 yards (140 m), though practical range tends to be less. After 150 yards the ballistics of the round are such that it will be difficult to compensate for the large "drop". The relatively short effective range, low report, and light recoil has made it a favorite for use as a target practice cartridge. The accuracy of the cartridge is good, but not exceptional; various cartridges are capable of the same or better accuracy. A contributing factor in rifles is the transition of even a high-velocity cartridge projectile from supersonic to subsonic within 100 yards (91 m). As the bullet slows, the shock wave caused by supersonic travel overtakes the bullet and can disrupt its flight path, causing minor but measurable inaccuracy. [citation needed]



Two .22 LR rounds compared to a .45 ACP cartridge.

When zeroed for 100 yards (91 m), the arc-trajectory of the standard high-velocity .22 LR with a 40-grain (2.6 g) bullet has a 2.7-inch (69 mm) rise at 50 yards (46 m), and 10.8 inches (270 mm) drop at 150 yards (140 m). A .22 LR rifle needs to be zeroed for 75 yards (69 m) to avoid over-shooting small animals like squirrels at intermediate distances.

As a hunting cartridge, rimfire are mainly used to kill small game. It is highly effective on squirrels and rabbits at distances closer than 150 yards (140 m) and on ground hogs, marmots, and foxes closer than 80 yards (73 m). It has been successfully used on large creatures such as coyotes, but range should be limited to no farther than 65 yards (59 m); head and chest shots are mandatory with the most powerful .22 cartridge the hunter can use accurately.

Because a .22 LR bullet is less powerful than larger cartridges, its danger to humans is often underestimated. In fact, a .22 LR bullet is capable of inflicting very serious injuries (e.g. the four people wounded during the Reagan assassination attempt) or death e.g. the Kauhajoki school shooting (11 killed and 1 wounded), the Jokela school shooting (8 killed and 1 wounded), or the 1979 Cleveland Elementary School shooting (2 killed and 8 wounded) as well as the assassination of Robert F. Kennedy. Numerous other shooting incidents have demonstrated that .22 LR bullets can easily kill or seriously injure humans. [5][6][7] Even after flying 400 yards (370 m), a .22 bullet is still traveling at approximately 500 ft/s (150 m/s). A standard rimfire cartridge can have a ballistic range of up to 1.5 miles (2,400 m). [citation needed] Ricochets are more common in .22 LR projectiles than for more powerful cartridges as the combination of unjacketed lead and moderate velocities allows the projectile to deflect – not penetrate or disintegrate – when hitting hard objects at a glancing angle. A .22LR can ricochet off the surface of water at a low angle of aim. Severe injury may result to a person or object in the line of fire on the opposite shore, several hundred yards away. [8]

Rimfire bullets are generally either plain lead (for standard velocity loads) or plated with copper or gilding metal (for high velocity or hyper velocity loads). The thin copper layer on the bullet functions as a high velocity lubricant reducing friction between the bullet and the barrel, thus reducing barrel wear. It also prevents oxidation of the lead bullet. Lead tends to oxidize if stored for long periods. Oxide on the bullet's surface could increase its diameter enough to either prevent insertion of the cartridge into the chamber, or — with hyper velocity rounds — cause dangerously high pressures in the barrel, potentially rupturing the cartridge case and injuring the shooter. Standard and subsonic cartridges use a wax lubricant on lead bullets for the same purpose at lower velocities.

Variants

There is a variety of different types of .22 LR loads. They are often divided into four distinct categories, based on nominal velocity:

- Subsonic, which also includes "target" or "match" loads, at nominal speeds below 1,100 ft/s (340 m/s).
- Standard-velocity: 1,000–1,135 ft/s (300–346 m/s). Common velocities are around 1,125 ft/s (343 m/s).
- High-velocity: 1,200–1,310 ft/s (370–400 m/s) per second.
- Hyper-velocity, or Ultra-velocity: over 1,400 ft/s (430 m/s).

Subsonic

Subsonic rounds have a muzzle velocity of approximately 1,080 ft/s (330 m/s), less than the speed of sound . These rounds are sometimes equipped with extra heavy bullets of 46–61-grain (3.0–4.0 g) to improve the terminal ballistics of the slower projectile. Conversely, these rounds may contain little more than a primer and an extra-light bullet.

Subsonic rounds are favored by some shooters due to slightly superior accuracy and reduction in noise. Supersonic rounds produce a loud crack which can scare away animals when hunting. Accuracy is reportedly improved with subsonic rounds because a supersonic bullet (or projectile) that slows from supersonic to subsonic speed undergoes drastic aerodynamic changes in this transonic zone that might adversely affect the stability and accuracy of the bullet. Additionally, the use of subsonic rounds is reported to reduce wastage of meat caused by a high-velocity round passing and destroying tissue. [citation needed]

Because the speed of sound in air at 68 °F (20 °C) is approximately 1,115 ft/s (340 m/s), the subsonic round's muzzle velocity is slightly below the speed of sound under many hunting conditions. However, under cold air conditions at 32 °F (0 °C), the speed of sound drops to 1,088 ft/s (332 m/s), approximately muzzle velocity. Hence, a "subsonic" round used below this temperature may be supersonic, and during the transition from supersonic to subsonic velocity, it may become unstable, reducing accuracy. To counteract this, some cartridge manufacturers have lowered the speed of their subsonic ammunition to 1,030 ft/s (310 m/s) or less.

Various combinations of subsonic rounds and semi-automatic .22 LR firearms result in unreliable cycling of the firearms' action, as the result of insufficient recoil energy. Some subsonic rounds use heavier bullets (achieving lower velocities) in order to ensure that, as a result of increased bullet mass, there is enough energy to cycle common blow-back actions. As an example, the Aguila .22 LR SSS "Sniper SubSonic" round, has a 60-grain (3.9 g) bullet on .22 Short case, providing the cartridge the same overall dimensions as a .22 Long



The subsonic Aguila Super Colibri.



.22 caliber Aguila Sniper Sub-Sonic (right) with .22 long rifle for comparison

Rifle round. However, other problems may be encountered: the heavier and longer bullet of the Aguila cartridge requires a tighter barrel twist (by the Greenhill formula) to ensure that the bullet remains stable in flight.

There are two performance classes of .22 rimfire subsonic rounds. Some subsonic rounds, such as various .22 Short or .22 Long "CB" rounds, give ~700 ft/s (210 m/s) velocity with a 29-grain (1.9 g) bullet providing relatively low impact energy. These may not use any, or only small amounts of gunpowder, and have the characteristics of rounds intended only for indoor training or target practice rather than hunting. Where these are in .22 LR form, it is only to aid feeding in firearms designed for the cartridge, rather than older .22 CB shooting gallery rifles. The Aguila SSS gives ~950 ft/s (290 m/s) velocity with a 60-grain (3.9 g) bullet offering energy equivalent to many high velocity .22 Long Rifle rounds using standard 40-grain (2.6 g) bullets. Other heavy bullet subsonic rounds give similar performance, and are intended for hunting of small game, or control of dangerous animals, while avoiding excessive noise.

Standard velocity

Standard velocity rounds have a slightly supersonic muzzle velocity of around 1,125 ft/s (343 m/s), and a "normal" bullet weight of 40-grain (2.6 g). Standard velocity cartridges generate near or slightly-supersonic velocities. These rounds generally do not develop these velocities in handguns because the short barrel does not take full advantage of the slower powder.

High velocity

The Long Rifle was originally loaded with black powder. The first smokeless powder loads were intended to match the standard velocity of the original black powder rounds. Smokeless powder is more efficient than black powder, and the cartridge cases could hold more powder. Smokeless powder loads, called "high speed" or "high velocity", were offered by the major ammunition makers, giving a typical velocity increase of twenty percent (1,200 feet per second (370 m/s) to 1,300 feet per second (400 m/s)) while still using the standard 40-grain (2.6 g) solid or 36-grain (2.3 g) hollow point lead bullet.



High-velocity, copper-plated .22 LR rounds

Hyper velocity

Many .22 LR cartridges use bullets lighter than the standard 40-grain (2.6 g), fired at even higher velocities. *Hyper velocity* bullets usually weigh around 30-grain (1.9 g) to 32-grain (2.1 g) and can have a muzzle velocity of 1,400 feet per second (430 m/s) to 1,800 feet per second (550 m/s). This higher velocity is partially due to the use of lighter bullets.

The CCI Stinger was the first hyper velocity .22 LR cartridge, and provided a significant increase in velocity and energy over standard rimfire rounds. The Stinger case is longer than that of the Long Rifle (approx. .71 inches (18 mm) versus .595 inches (15.1 mm) for the Long Rifle) but the plated hollow point bullet is lighter and shorter at 32-grain (2.1 g), giving the same overall length as the Long Rifle cartridge. A powder with a slower burning rate is used to make the most use of the length of a rifle barrel. [citation needed] Most .22 Long Rifle powders increase velocity up to about 19 inches (480 mm) of barrel length; the powder used in the Stinger increases velocity up to the longest .22 barrel length tested by the NRA, 26 inches (660 mm). [citation needed]

Later hyper velocity rounds were introduced by other makers, based on the Long Rifle case with lighter bullets in the 30-grain (1.9 g) weight range and slow burning rifle powder loadings. The overall length of many of these cartridges was less than the standard overall length of the standard Long Rifle. [citation needed] One example was the Remington Viper, another is the Federal Spitfire.

The CCI Velocitor hyper velocity round uses the standard Long Rifle case size and a standard weight 40-grain (2.6 g) bullet of proprietary hollow point design to augment expansion and trauma. This cartridge has a muzzle velocity of 1,435 feet per second (437 m/s). Due to the better ratio of bullet mass to air resistance, Velocitor performs better at longer range compared to the light bullets of other hyper velocity rounds. [citation needed]

Shot cartridges

Special .22 LR caliber shot cartridges, usually loaded with #12 shot, have also been made. These are often called "rat-shot" or "snake-shot" due to their use in very short range pest control. Such rounds have either a longer brass case that is crimped closed, or a translucent plastic "bullet" that contains the shot and shatters upon firing. In specially-made .22 bore shotguns, the shot shells can be used for short range skeet shooting and trap shooting at special, scaled-down, clay targets.

Full metal jacket

During World War II, a full metal jacketed version of the .22 LR was developed for the suppressed High Standard HDM pistol. []



Tracer ammunition is also available in rimfire. [9]



Cartridge construction

The standard .22 rimfire cartridges (BB, CB, short, long, long rifle) differ in construction from most other cartridges in the way the bullet is constructed and held in the case. In "normal" cartridges, the bullet is inserted completely within the "neck" of the cartridge case, being held in place by tension from the case neck around the bullet bearing surface and, in some cases, a small crimp at the very top of the case around a cannelure (groove) in the bullet. Bullets for the standard .22 RF (does not include the .22 Rim Fire Magnum or .22 WRF/.22 Remington Special) are constructed with a "heel" (stem) on the rear of the bullet which is inserted into case and the case mouth is then crimped around that stem, leaving the majority of the bullet bearing surface exposed and making the diameter of the case and the bullet the same.

Although it is possible to handload .22 rimfire cartridges, the task is far more time-consuming than with regular centerfire cartridges and provides little benefit for the amount of work involved. This is further complicated by the cartridge's use of heeled bullets: attempting to extract the original bullet may render it unusable, and attempting to load another bullet may require the use of additional tools to create the needed heel. Reloading a used cartridge is virtually impossible, as the primer is built into the rim of the cartridge itself.

Note that the .22 WMR case diameter is larger than the bullet. This construction method has an inherent weakness in that it provides only minimal protection for the cartridge from exposure to moisture or other elements that adversely affect ammunition reliability. One may take one of these cartridges, hold the case with the fingers of one hand and the bullet between the fingers of the other hand and actually turn (twist) the bullet without turning the case (a little resistance may be encountered at first). This means that the seal between the bullet and case is minimal. Overall reliability of today's rimfire ammunition is extremely high, but is still considerably lower than centerfire ammunition.

Cartridge length

The .22 LR uses a straight walled case. Depending upon the type and the feed mechanism employed, a firearm which is chambered for .22 LR may also be able to safely chamber and fire the following shorter rimfire cartridges:

- .22 BB, in cap, short or long lengths
- .22 CB, in cap, short, long, and long rifle lengths
- .22 Short
- .22 Long

.22 Long Rifle may also be used in firearms chambered for the obsolete .22 Extra Long.

Usage

Today, rimfire rounds are mainly used for hunting small pests, for sports shooting, for plinking, and for inexpensive training. The .22 LR is the choice for several shooting events: Bullseye, plus divisions of



metallic silhouette and pin shooting, most high school, collegiate, Boy Scouts of America, Appleseed Project, 4H shooting events, and many others. Good quality rimfire ammunition can be quite accurate. The main advantages are low cost, low recoil, low noise and high accuracy-to-cost ratio. The main disadvantage is its low power; it is better suited for use on small game and other small animals;^[10] as a defensive cartridge, it is considered inadequate, though the small size allows very lightweight, easily concealable handguns which can be carried in circumstances where anything larger would be impractical. Despite their limitations, .22 LR pistols and rifles can kill someone and are often used for self-defense and crime simply because they are prevalent, inexpensive, and widely available to civilians.

Most semi-automatic rifles firing .22 LR cartridges will often only work properly when firing standard or high velocity rimfire ammunition; subsonic rounds will often not cycle their actions properly. Bolt-action or lever-action rifles, however, can use any of the variants (high velocity to subsonic). Due to the low bolt thrust of the .22 LR cartridge, most self-loading firearms chambered for the cartridge use the direct blowback operation system.

The tiny case of the .22 LR and the subsonic velocities (when using subsonic ammunition) make it well suited for use with a firearm suppressor (also known as silencers or sound moderators). The low volume of powder gases means that .22 LR suppressors are often no larger than a bull barrel; the Ruger 10/22 and Ruger MK II are common choices, because of their reliability and low cost, and the resulting product is often nearly indistinguishable from a bull barrel model (although weighing far less). Where firearm suppressors are only minimally restricted, a .22 LR firearm with a suppressor is often favored for plinking, as it does not require hearing protection or disturb the neighbors. Local government agencies sometimes use suppressed rimfire weapons for animal control, since dangerous animals or pests can be dispatched in populated areas without causing undue alarm.

The .22 LR has also seen limited usage by police and military snipers. Its main advantage in this role is its low noise, but it is usually limited to urban operations because of its short range.^[11]

The Israeli military used a suppressed .22 LR rifle in the 1990s for riot control and to "eliminate disturbing dogs prior to operations", though it is now used less often as it has been shown to be more lethal than previously suspected. Some other examples include the use of suppressed High Standard HDM pistols by the American OSS, which was the predecessor organization of the CIA. Francis Gary Powers was issued a suppressed High Standard for the flight in which he was shot down. Suppressed Ruger MK II pistols were used by the US Navy SEALs in the 1990s. [12]

Specifications

Muzzle velocity (nominal):

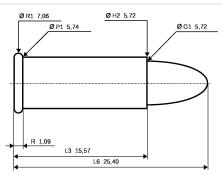
- 40-grain (2.6 g) lead: 1,082 ft/s (330 m/s) .22 LR Subsonic
- 36-grain (2.3 g) copper plated lead: 1,328 ft/s (405 m/s) .22 LR High Velocity

Note: actual velocities are dependent on many factors, such as barrel length of a given firearm and manufacturer of a given batch of ammunition, and will vary widely in practice. The above velocities are typical.

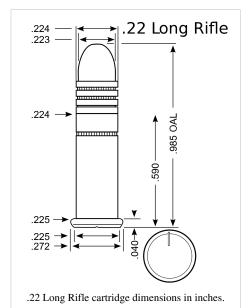
According to the official C.I.P. guidelines, the .22 LR case can handle up to 30,000 psi copper crusher (measuring method crusher conformal) pressure. In C.I.P. regulated countries, every rifle cartridge combo has to be proofed at 125% of this maximum C.I.P. pressure to certify for sale to consumers.

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- [5] http://www.dailymail.co.uk/news/article-2187810/Jenn-Stanovich-Mother-says-accidental-shooting-girl-6-Gods-call.html
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.22 Long rifle maximum CIP cartridge dimensions. All sizes in millimetres (mm). The common rifling twist rate for this cartridge is 406 mm (1:16 in), 6 grooves, land width = 2.16 mm, Ø lands = 5.38 mm, Ø grooves = 5.58 mm.



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