

The Arcane World of Cartridge Designations

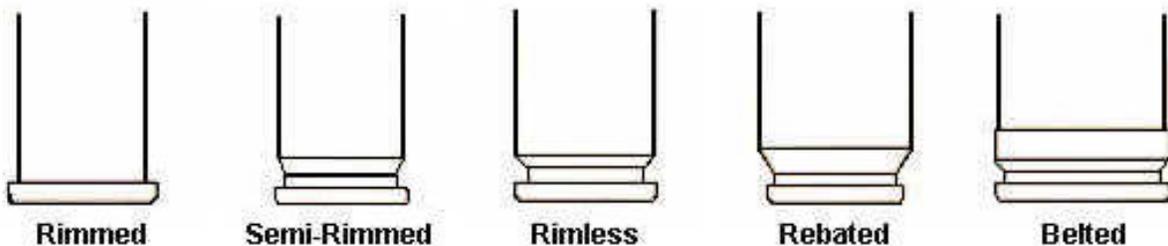
By Dick Culver

Here's one subject that surrounds and sometimes plagues us on a daily basis. Even though we deal with ammunition in the pursuit of our hobby, interest, sport and sometimes even our profession, many of those who throw cartridge designations around rather cavalierly have no true feel for their origin or meaning. Let me take a cut at clarifying things for the newcomers (and maybe even a few old-timers) entering into the "Arcane (secret) World of Cartridge Designations".

This should not be considered a definitive work on the subject, just a quick and dirty primer so you can smile to yourself and knowingly speak "cartridge" to the seasoned ol' veterans, and maybe even teach them a thing or two.

Before we get too deeply into the actual subject matter, perhaps it would be helpful to define a few terms so that we are all on the same wavelength. In this article we will be primarily concerned with metallic cartridges, of which we have several types that are familiar to most individuals interested in the shooting sports or self-defense. Virtually all cases can be put in the category of straight walled cases (ex: .45 Colt, .45-70), bottle-necked cases (ex: .30-'06, .44-40), and tapered cases (ex: 9mm Parabellum, .30 Carbine). The cases can further be classified by their rim type, such as "rimmed", "rimless", "semi-rimmed", "rebated rim" and "belted". The outward configuration of the case such as a straight walled case is self-explanatory, but not necessarily the classification by "rim style". For clarification I offer the following illustration:

Types of Case Rims



Now, onward to the actual cartridge designation(s) by caliber. Let's start with the old timers in the cartridge world, as they will give us a few clues into the present. For instance, do you know what is meant when they speak of the .45-70, the .44-40, the .40-62 or the .30-30? These are leftovers from the days of blackpowder cartridges, and are perhaps the simplest to explain. The .44-40, simply put, referred to a .44 caliber cartridge loaded with 40 grains of blackpowder. It follows rather elementarily that the .32-20, and the .38-40, etc. simply use the caliber (designating the diameter of the bore, although usually not very accurately), followed by the number of grains of blackpowder used to propel the projectile on its way to the target. Blackpowder rifle cartridges get a bit more complicated, although once you understand the system, they too fall into a rather ordered system. Bet you thought that the .45-70 was just called the .45-70, huh? Wellll... not necessarily. They had the .45-70-405 and the .45-70-500 and even the .45-70-300. The third numerical designation represents (represented?) the bullet weight in grains. For instance, the U.S. Service load for the Trapdoor Springfield came in two flavors. The .45-55-405 was the load used by the Cavalry in the Carbines, and the .45-70-500 was the Infantry load. Both cartridges were interchangeable as far as chambering and firing in the Trapdoors, but the 500 grain projectile propelled with 70 grains of blackpowder, while perfectly safe to fire in the carbine, was a "bit" uncomfortable to shoot in the shorter and lighter of the two weapons. Torching off the Infantry load in a carbine while sitting on the quarterdeck of horse at full gallop would be a thrill indeed! Complaints from the more "effete" Cavalry troopers resulted in the 405-grain projectile propelled by a somewhat "wimpy" load of 55 grains of powder.

Think you've got it now? Naw, let's throw a little extra stuff in the game. What about the Sharps and rolling/falling block cartridge designations. We have, for instance, the famous target cartridge, the .45-120-3 ¼ (usually pronounced, the forty five by 120 by 3 ¼). Here we're talking about a .45 cartridge using

a load of 120 grains of blackpowder contained in a cartridge case 3 ¼" long. Even the .45-70 was sometimes referred to as the .45-70-2 ¼.

Now that we have covered the hyphenated cartridge designations, we come to a gray area that occurred during the transition from black to smokeless powder. Utilizing the tried and true precedents, when the .30-40 Krag was introduced as our new service cartridge in the early 1890s, a real dilemma reared its ugly head. Blackpowder was simply blackpowder utilizing essentially the same formula and having the same characteristics, with the burning rates controlled by the size of the powder grains. The larger the grain, the slower it burned. For instance, FG (large powder grains, designed primarily for rifles) burned slower than FFG and FFFG (pistol powder) or FFFFG (priming powder). The more "Fs" the smaller the grains and the faster it burned, but the quantity used was not nearly as critical with black powder as it was with smokeless powder. If you inadvertently used 70 grains of "triple F" in a .45-70, the dirty burning, smoky, foul smelling stuff was pretty forgiving, blackpowder being a mechanical mixture. Conversely "smokeless powder" is a powder produced by chemical reaction(s) and usually has widely varying burning rates from powder designation to powder designation. For instance a load of 42 grains of IMR 4895 might be perfectly safe in the .308 Winchester, but 42 grains of Bullseye will make you a prime candidate for "harp lessons"! The original .30-40 Krag cartridge used a .30 caliber projectile propelled by 40 grains of smokeless powder – the question was WHAT smokeless powder?! This carried over for one last try in the designation of the ol' "Thirty-Thirty Winchester" that has become almost an American icon. The coming of smokeless powder spelled the doom of the hyphenated cartridge designations. You can imagine the problems that would be encountered if you spoke of the .308 Winchester as the .30-42! The question would immediately be "forty two grains of WHAT?"

As a quick aside, for many years, the service cartridge designations were followed by the descriptive term "Government", as in the ".45-70 Government". The "last gasp" at attempting to call the (then) current service rifle cartridge "The .30 cal. Govt." was directed at the original cartridge utilized in the U.S. Magazine Rifle Model 1903, sometimes (now) called the .30-'03. Originally it (the 220 grain round nosed load) was known as the .30 Government, but then the .30-40 Krag had also been called the .30 Government upon occasion (most especially when it was listed as a cartridge chambering option in the Model 1895 Winchester lever gun). Throwing up their hands in dismay, the Army Ordnance folks decided to name the new replacement cartridge for the M1903 "the .30-'06". This of course stood for a .30 caliber cartridge adopted in 1906. The designation of .30-'03 was an "after the fact designation" for the original 220 grain bullet cartridge initially used in the '03 Springfield to differentiate it from the then new .30-'06. Simply calling the former cartridge "The .30 Government" was a little confusing since we had two of the "blighters" hanging around often using the same designation.

How about the early service pistol rounds? Our first full-blown official metallic pistol round was known as the .45 Colt (since it was developed by Colt, it seemed only fair I suppose). All went without a hitch until a certain Col. Schofield came into the picture. He was much impressed with the break-top loading and ejecting system utilized by Smith and Wesson. This system, he felt would be a much better and faster system for the galloping Cavalryman to reload aboard a horse than the somewhat laborious side loading and ejecting system of the Colt. While he no doubt had a point, S&W chose to utilize their standard "big bore" top break pistol frame, which was a bit short to accommodate the full length .45 Colt Cartridge. S&W designed the "Schofield Smith" to use a cartridge they called the .45 S&W (again, only fair). The U.S. Army bought a number of these pistols in 1877 and they were issued and essentially interspersed with the venerable Colt with no thought of the ammunition problem they were creating. Much like the .38 special which will chamber in the .357Magnum, but not vice versa, so it was with the .45 S&W and the .45 Colt. To solve this dilemma, the government simply adopted the .45 S&W as standard and called it the .45 Government Pistol Cartridge. This rather interesting solution has resulted in a cartridge misnomer that has lasted for over 100 years. Virtually everyone has heard the .45 Colt called the .45 Long Colt, but of course as you now know, that is not and has never been the official name of the .45 Colt cartridge. As the Schofield models found their way into the civilian market in the late 1800s (Wells Fargo even used some of them), the owners had to come up with suitable fodder for their sidearms. Walking into the local gunsmith's or hardware store asking for a few .45 pistol cartridges would no longer do. Those using a .45 Peacemaker didn't want the less powerful .45 S&W stuff when going in harm's way, even though they would shoot just fine in their Colt self-protection hardware. Thus it became customary to call the Peacemaker round "The .45 Long Colt" to differentiate it from the shorter S&W round.. The pesky .45 S&W cartridge has long since disappeared from the scene, but the misnomer of ".45 Long Colt" seems to survive despite all attempts to educate its users to the fact that they are REALLY using the .45 Colt... Ah well, some things are so ingrained as to defy common sense and education I suppose.

To make matters even more confusing, there was even a third .45 Government round (this time of full .45 Colt length) designed for revolvers, and would chamber in the standard .45 Colt chamber. The only problem was that the cartridge rim was larger in diameter than the original (commercial) .45 Colt. This version of the .45 Colt was produced at Frankfort Arsenal (and perhaps other government locations) but as far as I know it was never a commercially available cartridge. The reason for this version's existence was tied in to our military experience in the Philippines around the turn of the century. Almost everyone has heard of the rather dismal performance of the .38 caliber pistols issued to our military at that time. When the military turned in the old .45 "thumbster Colt single actions" they came up with a marvelous little double action pistol in a caliber which was essentially a rather underpowered version of the .38 Special. A call for help from our deployed forces resulted in many of the old .45 single actions being broken out of storage and shipped to the Philippines along with some of the later 1877 Colt Double Actions in the same caliber. The Philippine experience resulted in the Thompson-Legard Tests that recommended a service pistol caliber of no less than .45 caliber. The U.S. Government was then experimenting with adopting a semi-automatic pistol, but a final design had not yet been adopted in 1909. Anxious to give our troops adequate "pistol power", the government adopted an interim "fix" to the problem. They contracted with Colt to produce a Government version of the "New Service Colt" in .45 Colt caliber, and designated it the Model 1909. There were versions of the 1909 Model marked U.S. Army, U.S. Navy and even a "round butted" version marked U.S.M.C. As all of you know who have any experience with the .45 Colt Cartridge, one of its weaknesses is the rather narrow rim that had sometimes given extraction problems in the blackpowder days with the Single Action on the frontier. That coupled with the fear that the narrow rim would give extraction problems with the "ejection star of a "new fangled", swing out cylinder double action, caused the designers of the new "*interim*" revolver to remedy the problem by modifying the old .45 Colt cartridge and giving it a wider case "rim". Needless to say it worked just fine in the new Model 1909s, but if you tried to load it into the Colt Single Actions of the same caliber (which had a cylinder that was smaller in overall diameter) the rims would interfere with one another and would only allow you to load every other chamber (interestingly enough, the 1909 worked just fine with a standard .45 Colt cartridge)! The new government version of the .45 Colt round went the way of the "Do-Do Bird" with the coming of the new 1911 Colt.

How about the pistol cartridge designations ending in "ACP"? For instance, we have the .25 ACP, .32 ACP, .38 ACP and the .45 ACP. These are simply an abbreviation for "Automatic Colt Pistol", and were named for the Company that designed and built the (original) pistols to fire the cartridge. The cartridge designations were proprietary but not limited to pistols designed *only* by Colt. It is quite common for many handguns to utilize the .45 ACP, although built by S&W, Glock, SIG, etc. The ACP simply is a "doff of the hat" to the origins of the cartridge. Many other cartridges are linked to their originators, such as the .357 Magnum (officially the .357 S&W Magnum). The word "*Magnum*" is registered to S&W and must be so identified when listing the cartridge, even if the pistol happens to be a Colt Python (using the S&W .357 Magnum cartridge – take a look sometime!). You really get into an intertwinement of terms with the .44 Remington Magnum (the official designation of the Dirty Harry cartridge). Here we have Remington as the originator of the cartridge, but then they (the folks at Remington) were working hand in glove with S&W who was working to produce the pistol that Remington was designing the ammunition for. Interestingly enough, Ruger went through Remington's trash cans, found some of the .44 Magnum test brass and actually scooped S&W with the first commercially offered pistol designed to shoot the new cartridge! Commercial espionage had paid off in this case!

Or how about actual bore size? In the United States, the bore size is usually designated in "hundreds (or even thousands) of an inch". That would be great if everyone had stuck with the original plan, but it got badly corrupted in the 1800s. The .44 Cap and Ball revolvers were usually .45s (going somewhere between .451 up through .457 in the case of the Ruger "Old Army") and the .36 Navy guns were close to .38 caliber. The original .45 Colt had a bore diameter of .454, but this has been reduced to .452 in modern versions of the Colts and S&Ws. Most .32 Autos are really .30 caliber, and the .38-40 goes closer to a true .40. The Colt versions of the .357 are closer to a .356, while S&W sticks to the original .357. The 9mm runs from .355 to .356 depending on the make of the pistol and/or barrel. The .38 S&W Special (yeah, I know, there is also a Colt .38 Special also) is really a .357 in bore diameter, and so it goes. The so-called .44 Specials and the .44 Magnum are really closer to being .43s (.429). The .45 ACP has always been a .452, and has now been joined by the .45 Colt since they came down from a .454. It's always a good idea to "slug" the bore on your .45 Colt if you are handloading lead pistol bullets if you want maximum accuracy or are pushing the envelope of maximum load development... sometimes a "silly little

millimeter" will make a very large difference in accuracy and safety! Some of the modern Single Actions copies made in Europe vary a bit on their bore and cylinder sizes; better to be safe than sorry!

Then we have a couple of other oddities; we have the .250-3000 which is a .25 caliber that was supposed to have a muzzle velocity of 3000 fps, and the .30-338, which is a .338 case necked down to .30 caliber, or the 8mm-'06 which is a .30-'06 necked up to 8mm, or the .358 Winchester, which was a .308 also necked up to .35 caliber. This was a modernization of the old .35 Whelen, which was simply a .30-'06, also necked up to .35 caliber. It seems that no one is ever satisfied. Generally speaking, when you see a cartridge with a hyphenated designation of two calibers, with the first number indicating a larger size than the original case (338-'06 or 8mm-'06) it indicates a cartridge that has been created by "necking-up" an existing cartridge. Necking down doesn't always follow the same pattern, as the .270 Winchester is a necked-down .30-'06, but on the other hand we have such cartridges as the .25-'06 which is also necked down to .25 caliber from the .30-'06. Hummm...

We can also classify our cartridge cases by their profile, method of extraction, and method of chamber retention (please refer to the illustrations at the start of the article). We have rimmed cartridges (probably the oldest if you don't count "pin-fires" or "teat-fire" cases). Under rimmed, we have "rimfire" where the priming compound is contained in the rim of the cartridge. Then we have centerfire rimmed cases (.30-30, .45-70, etc.) We have rimless cartridge cases such as the .308 or .30-'06. We have straight walled cases (.45-70, and the .38 Special), and then we have bottle-necked cases (again .308 or .30-'06 are good examples). ...And of course we have "belted cases" (designed to headspace on a case "belt" located just forward of the case rim, as opposed to the shoulder of the case or the rim of the case itself - a quick example here is the .300 Winchester Magnum.). We have semi-rimmed cartridges (the .38 Super cartridge) and "rebated cases" (cases with a rebated rim) such as the .41 Action Express or .50 Action Express (usually abbreviated as the .41 AE, and .50 AE respectively). The rebated rims are usually designed to use a (pistol) slide face designed for a smaller round so that you can use the existing extractor without changing slides on a semi-auto pistol (a .41 AE barrel will usually drop right into a 9mm pistol slide and sometimes (but not always) even use the same magazine, thus making a pistol with a convertible caliber by simply changing barrels). We haven't even touched on the Berdan vs. Boxer Priming systems yet, or even corrosive as opposed to non-corrosive primers. Whew...

Okay, now that you are getting used to the fact that cartridge designations in the United States are a bit "iffy" (but at least understandable if you do your homework), let's take a look at the European designations. Until WWI very few Americans (with the exception of a few big game hunters who went on safaris on the Dark Continent) came into contact with the European stuff. The Great War changed all that, and since the boys "down on the farm" had now seen "Pariee" many of them brought home souvenirs of the 8mm Mausers picked up on the battlefield while saving the World for Democracy. While the British had followed the same general cartridge designation system as the United States (or the other way around) in using bore diameter expressed in "hundreds or thousands of an inch"; the ever-meticulous Germans had designated their bore diameters utilizing the metric system. The 8mm (actually a 7.92mm) followed this pattern, as they did firearms caliber designations in France and Belgium (the 8mm Lebel, etc.). The Germans even differentiated the length of their calibers by adding the designation of "Kurtz" (meaning short). For instance the small 7.92mm bottle-necked cartridge designed for the MP44 Assault Rifle was called the 7.92mm Kurtz as opposed to the longer standard German service round. In Europe, the little .380 ACP pistol cartridge is known as the 9mm Kurtz. The standard German pistol cartridge was the 9mm Parabellum (meaning "for war", but usually called the 9mm Luger in this country); and of course the famous Luger Pistol also came in the 7.62mm Luger caliber. Even though we had tested the 9mm Parabellum Pistol in this country at the turn of the century, the decimal system of bore designation never caught on. It wasn't until our involvement in NATO that we designated our service cartridge in millimeters. This was done of course, to preclude confusion in the re-supply of ammunition in a combat environment in the event of a war in Europe.

The 7.62mm NATO Cartridge is the NATO designation for our experimental T65 military cartridge (also called the .308 Winchester in the civilian world) . Immediately following WWII we had been working on a new service rifle cartridge to replace the old .30-'06. The new cartridge was designed to take advantage of the efficiency in modern smokeless powders not available at the time of the adoption of the .30-'06. The new T-65E3 experimental cartridge had the nominal ability to extract the same "paper ballistics" out of a case ½" shorter than the old "ought-six". This cartridge development was done in conjunction with the production of a new lightweight service rifle (that became the M14). The M14 and the T-65E3 cartridge were an excellent combination that the United States Ordnance people were most

pleased with. The fly in the ointment was that several other countries were also developing new cartridges and were vying to have THEIR new rounds adopted as the NATO standard. History notes that we prevailed, but not without giving some concessions to our NATO Allies. The first (and perhaps worst) was that WE agreed to adopt the 9mm as our standard pistol round (with the proviso that we would do so as soon as we adopted a new pistol – something that we mercifully didn't get around to until 1985). The second was that we couldn't call the cartridge "The .308 Winchester or T65 as the experimental government version was called (the .308 Winchester cartridge was simply a commercial "knock-off" of the newly developed Government round). We were required to use the official designation of "7.62mm NATO". This was really an exercise in semantics, as 7.62mm converted to inches IS ".308" in diameter. My only complaint (since I am no politician) is that granting any concessions to those European Yo-Yos offends my sense of United States sovereignty... MY ancestors came over here to get away from those clowns, and I am not comfortable conceding anything to them. Needless to say, I have never been approached for service with the State Department.

The Europeans also have one other maddening habit; they tend to add a few numbers to the cartridge designations to designate the length of the cartridge. For instance, the (full) official European designation for the 7.62 NATO is the 7.62 X 51, meaning the bore diameter is 7.62mm in diameter with a cartridge case length of 51mm. The official 9mm NATO is actually a 9 X 19, indicating a 9mm bore and a case length of 19mm, ad nauseum. Being an engineer by education, it's not that I don't appreciate precision in my scientific instrumentation and calculations, but when it comes to certain things, I'm hopelessly old fashioned. I like my shirt sizes in inches, my road travel distances and speed limits in miles and miles per hour and my bore diameters in inches – guess it's just my personal protest against the "One Worlders" and their attempt to bring our country into an "inter-dependent" society. My personal preference is for the rugged individualist carrying a .45-70 "lever gun", a "thuty-thuty" or an ol' "ought six"! Much like the immortal Harry Callahan, I am what the politically correct types generally refer to as a dinosaur.

And a further aside...

I know that some character is gonna' ask the question, "but how do you explain the use of the word caliber as used by the Navy? When I was aboard ship, they used to talk about a 5" 38 caliber gun, what exactly were THEY talking about?"

For the curious, here is how the Navy uses the word "caliber" in that context. When speaking of a 5" gun (5" indicating the diameter of the bore), the Navy indicates the length of the gun in "calibers". The Navy takes the circumference of the bore in inches and then calculates how many times that circumference can be laid out along the length of the tube (this is easier to picture if you think of running a piece of string around the circumference of the bore and then figuring how many times it can be laid out along the total length of the gun barrel). In other words, a 5" 38 means that the length of the tube is 38 times as long as the circumference of the bore. A 5" 54 is calculated in the same fashion. See, I told you that this was the "arcane world of cartridge designations"!

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