

Cartridge Case Jackets

Using fired cartridge cases to make jacketed bullets has been done for almost as long as there have been metal jacketed bullets. During wartime copper and copper alloys were strategic materials and almost all production of those alloys went to supporting the war effort. However dedicated shooters are not easily deterred from practicing their sport. It didn't take long for those shooters to discover that cartridge cases could be used to make many different caliber bullets. In fact some major bullet making businesses got their start from first producing bullets from old cases.

Probably the most common cartridge case to use is the .22 Long Rifle. .22 Short and later .22 Stinger cases were used to make different weight .224 bullets. The three rimfire cases are used to make open tip, flat base (OTFB) bullets ranging in weight from 40 grains to 60 grains.

.243 caliber bullets can also be made from the .22 Long Rifle and .22 Stinger cases but the cases are a little short for all but the lightest of bullets. Usually a fairly large soft point bullet weighing about 85 grains must be made with the short cases. However there is an alternative to the Long Rifle case and that is the .22 Winchester Magnum.

There are two rimfire cases that are long enough to make heavier open tip .243 bullets and those are the common .22 WMR (Winchester Magnum Rimfire) and the much older and less well known .22 WRF (Winchester Rim Fire). The WRF cartridge was a vast improvement on the .22 Long Rifle for small game hunting but was forgotten about when the .22 Magnum was developed. The WRF can be fired in the Magnum chamber just as .22 Shorts can be fired in a Long Rifle chamber and gives the shooter a lower cost alternative to the Magnum when the powerful WMR is not needed.

WMR and the shorter WRF case will make OTFB bullets in .243 caliber of about 100 grains and 90 grains. The two larger and longer cases can be drawn smaller and pinch trimmed to make long .224 or .228 bullets. They can also be used to make .257 plinking bullets.

Bullets made using rimfire cases as jackets have the velocity limited to about 3,000 fps. If driven above that the bullets can come apart in flight. Accuracy is usually good and they can be used to hunt varmints and small game such as rabbits. The cartridge case jacket is thin and will "blow up" if used on larger game.

The jackets made from .22 Long Rifle and .22 Shorts can be drawn smaller and used to make .20, 14, and even 12 caliber bullets.

Ask for the "Rimfire Bullet Jacket" data sheet for more information about using rimfire cases as jackets.

As useful as the rimfire cases are for making bullet jackets they can't be used to make bullets much larger than .257 caliber. There have been some attempts to use them to make bullets as large as .308 but it is a hit/miss proposition and usually is more trouble than it is worth.

So for larger calibers something else is needed and fortunately there are quite a few centerfire cases that can be used to make good bullet jackets.

It should be noted that while some cases might be just what the doctor ordered to use as a jacket for a particular caliber it may not be practical to do so. The .25-21 Stevens cartridge case would be perfect for making .308 diameter bullets but finding them would be quite difficult and if you had some in good condition they would be worth a considerable amount to collectors or shooters. The 6.5 X 58 mm Portuguese Vergueiro cartridge might be available in Europe and would be useful to make .458 bullets from but it isn't often found here in the US.

With that in mind a number of potential cartridge/jacket combinations will be listed in the chart at the end of the article. Some of the cartridge cases are suggested more to simply point out what can be done if the cases were to be available. In some parts of America certain calibers are more popular than in other parts. The .30-30 may see much more use in an area that has thick brush and Jack Pine forest while it may hardly be found in an area that has wide, open spaces and long-range hunting cartridges are the norm.

Rifle ranges remain good sources for fired cases and gun shows can be a source for inexpensive cases. Police departments can sometimes be a source for spent cases like the .40 S&W. High Power Rifle competitors often have .223, .308, 7.62 NATO, .300 Win Mag. as well as other cases that are no longer useable that they can be talked out of.

A little searching may be required to find a source for the cases needed but they can usually be found for most bullet diameters.

There are very few suitable cartridge cases available to use to make .264, .277, and .308 bullets from. These calibers are too large to use rimfire cases and too small to use most of the centerfire cases. Lightweight or half jacketed bullets can be made from some .32 caliber handgun cases and .22 Hornet cases can be used but finding them in any quantity might be difficult.

So for a few calibers there aren't many options but for most others suitable cases can be found.

In order to know what cartridge case can be used to make a bullet the bullet diameter must first be known. Cartridge nomenclature has always been a bit confusing but lately the manufacturers and wildcat developers seem to be determined in seeing who can come up with the most misleading name for the latest and greatest cartridge. In the past a cartridge might be called a .30 Super Blaster and we knew that it used a .308 diameter bullet. Today a .32 Thunderclap might actually be a .312 diameter but it could also be a .308 diameter bullet.

Fortunately it isn't too hard to determine the correct diameter of the bullet. A bullet from a factory round can be measured, a Cerrosafe cast of the barrel can be made, or the data can be found in any number of loading manuals. There are even online sources that can be used but be careful of the Internet as it is a place where lots of old and just plain wrong information lives on forever.

Once the bullet diameter is known it is time to find a suitable cartridge case that can be used to make the jacket. There are a few limitations that need to be observed when making cartridge

case bullets. The case head is usually rather thick and relatively hard. It is difficult to move that much metal around without a powerful press and stout dies.

Because of that it is usually best to only use the cases to make flat base bullets. It would be possible to machine a boattail onto a cartridge case but the other problem is that the concentricity of the case is not nearly as good as that of a commercial jacket. This means that long-range accuracy won't be as good as if a drawn jacket were to be used to make the bullet. Since the cartridge case bullet isn't as likely to be used at longer ranges a flat base will do very well.

It is important to use a case that has a head or base diameter that is close to the bullet diameter. Cases that are more than a few thousandths smaller than the bullet can be used but it is better to use a case that is somewhat larger than the bullet. The reason for this is that it is possible to draw, resize, the case head as much as twenty thousandths using a hand press but it is nearly impossible to expand the case head much at all. The thick base of the case simply will refuse to expand unless a great deal of pressure is applied to it. The amount of pressure needed is beyond the capacity of a hand press or most small hydraulic presses and dies.

The diameter of the case head can be determined by measuring the cartridge case or the data can be found in many reloading manuals. A book that is very helpful and should be in any shooter's library is "Cartridges of the World". This book lists the specs for thousands of cartridges and is well worth having. Looking through a loading manual or "Cartridges of the World" will reveal what cases can be used. For example if a .458 bullet is wanted a quick search of the books shows that the .308 Winchester, 30-06, .303 British, and a number of other cases can be used.

The rimless cases are easiest to use and cases like the .308 Winchester are plentiful. So that would be a first choice. In Australia, England, and even Canada the .303 British might be quite common. The .303 is a rimmed case so the rim will need to be removed before the case can be sized and used. All of these cases are about .470" in diameter at the case head. That means the case will need to be resized around thirteen to fifteen thousandths depending on the case and if it is bulged or not but that is well within the capacity of a hand powered swaging press.

Whenever possible use a cartridge case that has the least body taper possible. If there is a choice between using, for example, a .308 Winchester or a .257 Roberts case the .308 will be the better choice. Both cases have the same head size but the .308 has less body taper and will be easier to work with.

So a case that is a little over the bullet diameter is found, the cases are available in sufficient quantity, and at a reasonable cost. Now what?

The next step will be to sort and clean the cases. Tumbling the cases in crushed walnut shells or corncobs without any abrasive will help to clean the cases. Never use any polishing or tumbling media that has any abrasive of any type. The abrasive will stick in the surface of the cases and will damage the jacket making and bullet making dies.

When sorting the cases discard any that have heavy corrosion, head separations or potential separations, and those that are extremely dirty. **Be on the lookout for live primers.** It is possible for a primer that has a firing pin indentation to still be live. It could be a misfire. When annealing the cases, be careful to be sure a live primer can't go off and injure you or a bystander.

Now it is time to size the case as needed to just below the bullet diameter. Usually the case will need to be resized to about one-thousandth smaller than the bullet diameter. Even two thousandths will be OK. This will allow the case to easily fit into the bullet swage die and still be large enough to not require excess effort to expand it to bullet diameter.

Before the case can be sized the rim or belt is removed using a shear die. The belt or rim can be turned off in a lathe but usually the shear die is used. The shear die is made to work with a specific cartridge case. A die that is made to use .303 British cases will not work with .30-30 cases. However cases that have the same head diameter and rim or belt diameter can be used in the same die. A .22-303 British would work fine in the .303 British shear die. Most belted cases can have the belt cut off in the same die as the cases all have about the same head diameter.

Rimless cases don't have a belt or rim to worry about so they are easier to use. All that needs to be done to get them ready is to resize them.

.375 diameter bullets can easily be made from fired .223 Remington, 5.56 NATO, and even 9 mm cases. The case is trimmed to the needed length, annealed, pushed through the sizer die, and it is ready to be used. Other rimless cases are done in the same way.

Rimmed cases are trimmed to length, annealed, and sized once the rim is removed. Belted cases have the belt removed; the case is trimmed to length, sized, and then annealed.

For most cartridge cases the anneal will be done before the case is resized. Belted cases are best resized and then annealed. Generally a temperature of about 800 degrees Fahrenheit will do the trick but this will need to be adjusted to suit the case and brand being used. If the annealing is done using a hand held propane torch just heat the cases until they start to turn a dull red. Then drop them into cool water or just let them cool in still air.

The belted magnum cases are best trimmed to the desired length, sized, and then annealed by heating about one-quarter to three-eighths of an inch from the mouth to a dull red and then water quenching them. This softens the mouth of the jacket (case) so that it will not fold up on itself or crack when the bullet is pointed up. It also leaves the body of the jacket harder and stronger so that the jacket will resist the pressure on it when the bullet is pointed up.

If the jackets are too soft the jacket will push back on itself as the bullet is pointed up. This is most noticeable when making long, heavy bullets that have a sharper spitzer ogive.

Jackets/cases can be trimmed using a coping saw with a very fine-toothed blade or a tubing cutter can be used. If a tubing cutter is used be certain that the blade is sharp. A new cutter that is used only for trimming cases is best. Cases that are shortened using a tubing cutter will usually have the mouth of the case rolled in some. The easiest way to remove the mouth crimp is to use a tapered rod made from hardwood or steel and gently tap it into the case to flare the mouth back straight until the seating punch can enter the jacket without catching on the jacket mouth.

The sizer die used to convert rimless cases into jackets is a simple die that screws into the top of the swaging press. One end has a polished chamfer or lead that does the sizing as the case is

pushed into the die. There is a short bore section in the die that controls the diameter of the drawn jacket but most of the die is counterbored somewhat larger than the drawn jacket. It is important to set the die in the press so that the jacket can be completely drawn but also so that the least effort is needed to do the job. This setting is determined by trial and error.

If the first case drawn is not pushed through the bore section of the die the next case to be drawn will press against the base of the first and both case will be damaged. Sometimes the case will be crushed and it is even possible to damage the draw punch. As much as possible use the leverage of the press to do the work.

Rimmed and belted jacket making sets will have two dies. One die is used to shear the belt or rim of the case and the second die is a sizer die. The shear die will also have a stripper mechanism that will remove the belt or rim pieces from the shear punch as the press ram is lowered. Most rimmed cases will be pushed through the shear die in one stroke. Belted cases will usually have the belt sheared off, the press ram will be lowered, and a punch extension will be used to then push the case through the die on the second stroke.

The swaging press will be used in the short stroke mode that is used to swage bullets.

Now that the fired cases have been made into jackets the cases should be sorted by brand. There will be considerable difference in the case thickness and capacity between brands. This difference means that the cases will weigh differently.

One way to handle the weight difference is to sort the cases and swage cores to make the correct bullet weight with each brand. This means that several different core weights will need to be swaged.

I usually just make the swaged core for the heaviest case. The cores will then make a bullet that is too light when used with other case brands so I put the case and core on the electronic powder scale and put small lead shot in the case to make the bullet weight correct. Put the shot in the case before the solid lead core. A powered powder trickler is useful for dribbling shot into the scale pan.

I used to use only lead shot to make the bullet cores but the cost of shot has become quite high and it is hard to find soft lead shot. So now I just make a solid lead core from a cast core or from lead wire.

Once the cores and jackets are matched up to produce the desired bullet weight the core is seated in the case using the core seat die and a properly fitting core seat punch. Whether lead shot or a solid lead core is used it is necessary to seat the core in the jacket. This will expand the jacket to just under the bullet diameter and when the bullet is pointed up in the point form die a good bullet with a straight bearing will be produced.

The bullets can now be tumbled again to polish them some but I just load them up and shoot them.

Rimfire Cases to Jackets		
Bullet Diameter	Cartridge case	Notes
.144"	.22 Short, Long Rifle, or Stinger	Draw to .224, to .20, draw & trim to .17. Then draw to .14. Open tip, flat base or soft point bullet.
.177"	.22 Short, Long Rifle, or Stinger	Draw case to .224 then to .20, and draw & trim to .17. Open tip or soft point flat base bullet.
.204"	.22 Short, Long Rifle, or Stinger	Draw .224 to .20. Open tip or soft point flat base bullet.
.224"	.22 Short, Long Rifle, or Stinger	Unfold rim & draw to .22. Flat base, open tip or soft point.
.243"	.22 Short, Long Rifle, or Stinger	Unfold rim & draw to .22. Flare mouth to .243. Soft point, flat base bullet.
.243"	.22 WRF & .22 WMR	Unfold rim & draw to .243"
.25 ACP	.22 Short	Make .224 jacket. Seat core in .251 die.
.257"	.22 WMR, .22 WRF	Make .243 jacket. Seat core in .257 die.

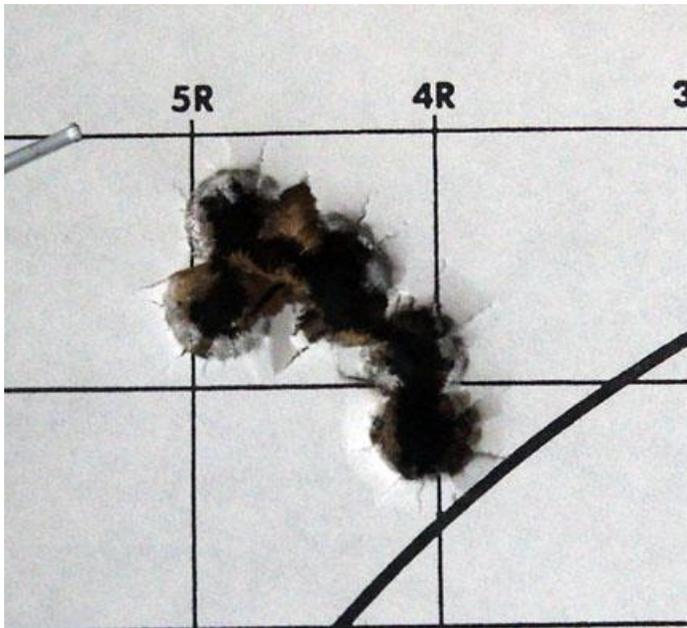
Centerfire Cases to Jackets		
Bullet Diameter	Cartridge Case	Notes
.264"	.25 ACP	Draw to .264. Makes a ½ jacketed bullet.
.264" (6.5mm)	.22 Hornet	Shear rim. Draw to .264. Open tip or soft point.
.277"	.25 ACP	Draw to .251. Makes a ½ jacketed bullet.
.277"	.22 Hornet	Shear rim. Draw and trim. Open tip or soft point.
.284" (7mm)	.22 Hornet	Shear rim. Slightly undersize but useable. OT or SP
.284"	5.45X18 Russian	Draw to .284 & trim. Soft point or open tip.
.300"-312"	.22 Hornet	Trim as needed. Undersize but useable. SP or OT.
.300-.312	5.45X18 mm Russian	Use as is. Hard to find. Soft point, light bullets.
.300-.312	.32 ACP, .32 Colt, .32 H&R Mag.	Shear rim if needed. SP light weight bullets.
.312"-323"	.32 Short & Long Colt, 32 H&R	Shear rim. Size as needed. Light weight, SP bullets.
.338"	.32 H&R Mag, 32 Short & Long Colt	Shear rim, size. Light weight, SP bullets.
.338"	.30 Carbine	Severe sizing but useable. Open tip or soft points.
.355"-358"	.25-20, .32-20	Shear rim and size. Pistol bullets, some rifle bullets.
.355"-358"	.30 Carbine	Size case. Open tip or soft points.
.366"-375"	9 mm Luger, 5.45 mm Russian, 9 mm Makarov	Size case. 200 grain soft point or ½ jacketed bullets.
.366"-375"	.222 Rem., .222 Rem Mag., .223 Rem., 5.56 NATO	Size & trim case. Makes open tip or soft points.
.366"-375"	.38 Special, .357 mag., .22 Jet, .221 Fireball	Shear rim, size and trim as needed. Makes soft point or open tip bullet.
.416"-423"	.40 S&W, 10 mm Auto	Size case. Light weight soft point or half jacket bullets.
.416"-423"	.25-35 Win, .225 Win, .7-30 Waters, 30-30 Win, .32 Win.	Shear rim and size case. Open tip or soft point bullets.

	Special, .38-55, .375 Win.	
.416"-.423"	.30 Remington, 7.62X39 mm	Size and trim. Soft point or open tip
.416"-.423	.224 Weatherby magnum	Shear belt, size, and trim. Soft point or open tip.
.429"-.431"	7.62X39mm (brass cases)	Size and trim. Soft points or open tips.
.429"-.431"	.41 Rem. Mag., .44 Special, .44 mag.	Shear rim and size. Trim in needed. Open tip or soft points. .44 cases require severe sizing.
.451"-.454"	.44 Special, .44 magnum	Shear rim and size. Trim as needed. SP or OT.
.458"-.475"	.22-250, .243 Win., .270 Win., .257 Roberts, .250 Savage, .244 Rem., 6 mm Rem., .25-06, .280 Rem., 7mm-08, 7.62 NATO, .308 Win., 30-06, 8mm Mauser, .358 Win., .45 ACP,	Size and trim as needed. Makes a soft point or lead tip bullet. There are many other cases with this head size, .470" that can be used. The .45 ACP case will make a light soft point or half jacketed bullet.
.458"-.475"	.303 British, .30-40 Krag, .444 Marlin, .307 Win., .44-40, 38-40, .44 Special, .44 Magnum, .45 ACP Rimmed.	Shear the rim, size, and trim as needed. The .45ACP Rimmed will make a half jacketed bullet or a light soft point.
.500"	.45-70	Shear the rim, size, and trim. Soft point or open tip.
.500"-.512", .50 BMG	6.5 mm Rem. Mag., .264 Rem. Mag., 7X61 Sharpe & Hart, 7 mm Weatherby Mag., .300 Win. Mag., .300 H&H, .350 Rem Mag., .358 Norma Mag., .308 Norma Mag., .300 Weatherby Mag., .375 H&H, .416 Rem. Mag., 8 mm Rem. Mag., .338 Win. Mag., .340 Weatherby Mag., .458 Win. Mag.	Shear the belt off, size, and trim as needed. Anneal the mouth of the case for about 1/4" to 3/8". Makes open tip or soft point bullet.
.500"-.512", .50 BMG	.270 Win. Short Magnum, .30 Win. Short Magnum, .30 Rem. Short Action (.30SA)	These cases have a head size of about .550" but can be sized as needed and trimmed. Makes soft point or open tip bullets.

All this talk is fine and perhaps interesting but the only thing that really matters is if the bullet performs reasonably well. If they don't shoot with some degree of accuracy there isn't much point to going to the trouble of making them. As an example of what might be expected the two groups below were shot using a .375 Chatfield-Taylor, which is basically a 375/458 Magnum. The bullets used were flat base, open tip weighing 250 grains with a 4S spitzer ogive at a velocity of about 2,500 fps. No special procedures were used to prep the cartridge cases, powder charges were dumped from a powder measure, and standard CCI primers were used. Shooting was done in the morning with the wind being light and switching from 3:00 to 7:00. The range was 100 yards.

The rifle used was a rebuilt 1917 Enfield with a barrel by Chick Donnelly. Most of the gunsmithing, stock work, and glass bedding was done by the owner of the rifle.

The targets are a copy of an old Remington sighting in target but they are scaled down a little so that the grid measures 7/8" instead of 1" as on the original target.



The group on the left has six shots in it with two shot in almost the same hole in the center of the group. The target on the right has three shots. Using the grid on the target and remembering that the grid is $7/8$ " square the group on the left is around $7/8$ " wide and about the same in height. The group on the right target is maybe $7/16$ " wide and a little under $7/8$ " in height.

Considering that these were shot using a hunting rifle, no unusual or extraordinary effort was used when loading the ammo, bullet weights were 250 grains +/- .5 grain I think most shooters would say that the bullets made using cartridge cases for the jackets did pretty well.

I'd reckon that the accuracy would be more than good enough to take an Elk at normal hunting distances and the cost for the bullets is almost nothing. Not bad, all in all.