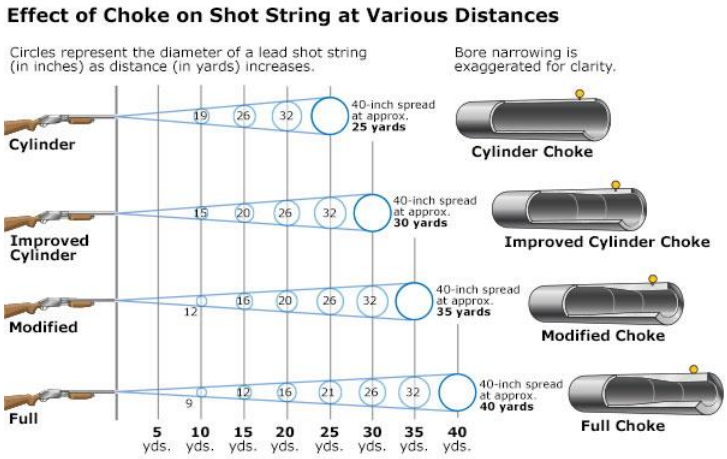
Choke it… or don't

Many issues back in an article about patterning your shotgun, I briefly discussed chokes and how they regulate the size of the pattern. But, like most things in the sport shooting world, there is so much more to understand.

Shotguns intended to shoot payloads of shot have a smooth bore. There is no rifling inside the barrel to impart spin on the payload and, interestingly, with a shot pattern would actually be counterproductive. The spin imparted by rifling would cause the shot pattern to disperse rapidly because of centrifugal force. Without spin the pattern will fly straight and will disperse more naturally by air resistance on the pellets, among other factors. This illustration helps to understand how choke works.



Early on in the development of shotguns it was learned that tapering the bore diameter to some degree near the muzzle would regulate the size of the pattern at given distances. From the early 1800s on through to today the principle of applying constriction; choking the barrel down, remains relatively unchanged. It is interesting that the amount of constriction is actually quite minute. A 12 gauge shotgun, for instance, has a nominal bore diameter of 0.729 of an inch. Adding a taper down equivalent of just two hundreths of an inch changes the pattern from a 40 inch diameter at 25 yards, Cylinder choke, to a forty inch pattern at 35 yards, Modified choke.

Standards were eventually established and remain to this day as illustrated in the table below. Where things get confusing is in the markings. Here in the US we apply names such as Improved Cylinder, Modified or Full… which are the three most common, while in the UK fractions are used. In most of the rest of the world a system of notches or dots are used to identify the constriction.

Choke (American designation)	Constriction (Inch)	Percentage of lead shot in 30-inch circle at 40 yards	Identification (Notches)	Identification (British)	Identification (Stars) (Spanish shotguns)
Cylinder	0.000	40 at 40 yd 70 at 25 yd	IIIII notches		***** stars
Skeet 1	0.005	45 at 40 yd 75 at 25 yd		1/8	
Improved Cylinder	0.010	50	IIII notches	1/4	**** stars
Skeet 2 (light Mod.)	0.015	55			
Modified	0.020	60	III notches	1/2	*** stars
Improved Modified	0.025	65	II notches	3/4	** stars
Full	0.030	70	I notch	1/1	* star
Extra Full	0.040	73	I notch		
Turkey	0.045 plus	75 plus	I notch		

Until the early 20th century choke was typically achieved by manufacturing the barrel with the desired constriction. The downside of this method is that, for the most part, the gun is good for a single purpose. For instance if you had a duck gun with a fixed full choke you typically needed a different gun, choked differently, for pheasant hunting.

Beginning in the 1920's technology advanced and the Cutts Compensator with interchangeable tubes was introduced. A shooter could have the unit installed on his gun, in some cases it was available as a factory installed option, and one gun could instantly serve many purposes by taking off one choke tube and replacing it with another. The downside of these units was that it usually required the barrel length to be shortened to keep it at a reasonable length with the unit installed, it added a great deal of weight to the muzzle and made the gun much noisier to shoot.

Many years later the Poly Choke device came along, and still can be found in the market place.

This system functions by manner of a collet which can be adjusted on the fly by twisting the outer sleeve, which is marked for the various amounts of choke. Some models came with a compensator to, purportedly, reduce recoil, most did not. Like the earlier Cutts unit, these become a permanent installation on the barrel. They don't add nearly as much weight as the Cutts, and don't change the handling characteristics or sight line as the Cutts unit does.

In the 1970's shotgun manufacturers finally began perfecting the idea of interchangeable choke tubes contained within the barrel. Starting in the early 1980s manufacturers began rolling out new models of their guns with choke tubes that the shooter could change in a matter of moments in the field. They achieved it by milling the muzzle to a much thinner wall and then threading that thinner wall to accept a tube which matched the unaltered bore diameter, creating a smooth, uninterrupted surface for the length of the bore. The constriction, or choke, takes place in the two to four inch length of the choke tube. The downside is that each manufacturer seems to have their own idea of tube length and threading so it becomes important to understand the pattern used on your particular gun. For instance, Beretta and Benelli use four different patterns between their various models. The good news is that interchange guides are available to help you choose the right tube for your make and model of gun.

So now that we know everything there is to know about chokes on shotguns, how much choke should we use? Like I've said so many times before in these articles, it depends. If we look back at the chart above we can see that the greater the constriction, the denser and tighter the pattern will be farther away from the muzzle. In singles trap many shooters will use a gun choked Modified. It is, literally, the middle of the road and is perhaps the best all-around choke. I very often recommend it to new shooters as they will likely be shooting the bird somewhere between 30 to 40 yards away and the Modified choke will deliver a fairly dense pattern at those distances but a pattern large enough to allow a little margin for error. The farther back you go on the field the more choke you will want to put on; as much as Full or even Extra Full when shooting 25 yard or farther Handicap. In doubles trap I will usually shoot an Improved Cylinder or Skeet choke for the first bird and a Modified or Improved Modified for the second. Others have their own combinations that work best for them.

In Skeet and some Sporting Clays presentations less choke is more. As you can see in the chart, there are two Skeet chokes, both of which deliver larger patterns at shorter distances as that game involves fast, fairly close shooting. In the hunting field less constricted chokes would be used for upland game birds where the shooting is close, while for waterfowl a full choke is most often the norm as the shots are generally much farther away and the birds larger dictating a very dense pattern at distance.

One important note; non-toxic shot used in waterfowl hunting shoots tighter than equivalent sizes of lead shot. That is going to become very important for the rest of us starting in 2019 when lead shot and bullets become forbidden for all game hunting in California. For example a Modified choke with lead shot will deliver a 40 inch pattern at 35 yards, but change to steel or tungsten shot and that Modified choke will deliver a 40 inch pattern at 40 yards… exactly like a Full choke! In fact, manufacturers recommend to not shoot steel or tungsten payloads in their

Full choke tubes, and you should never shoot these non- lead alternatives in an older gun with a fixed Full choke. This chart gives the full range of choke conversions from lead to steel.

Lead to Steel Shot Conversion

Lead/Bismuth	Measurement	Steel/Tungsten
Cylinder	.000"	Skeet
Skeet	.005″	Improved Cylinder
Improved Cylinder	.010″	Modified
Light Modified	.015″	Improved Modified
Modified	.020″	Full
Improved Modified	.025″	Extra Full
Light Full	.030″	N/A
Full	.035″	N/A
Extra Full	.040″	N/A

See you again soon with another shooting tip, but in the meantime, remember to keep those muzzles pointed to the ground when not on the firing line, and keep those actions open whenever you are not actually shooting. Safety first, foremost and always! -- Frank