

Bow Strings What You Need to Know

Types. There are two basic types of strings, the continuous loop that most people are using for recurve and compound bows, and the "Flemish Twist" that is often used on traditional longbows.

String Materials. Almost all bowstrings in modern bows begin life as an industrial fiber. While the brand names of many of these fibers are well known to archers, their properties are less well understood. And the point is the properties of these fibers are of crucial importance when choosing strings for your bow, be it recurve or compound. Today we have a huge variety of options, allowing the customers to select the blend of performance, durability and cost that best suits their needs.

The type of bowstring material that you use is entirely up to you. But please make sure that your bow is designed to take the bow string that you are about to use. Most vintage recurve and traditional bows with wood or wood/glass limbs are not designed to take the performance strings such as *Fast Flight*, *Dyneema*, *BCY 450*, etc.

- **Polyester (Low Cost).** Polyester is today's the "classic" string fiber. It is called by the Dupont trade name **Dacron**, although there are other suppliers of polyester fibers. Polyester is widely used for its combination of reasonably low stretch, good strength, low cost and durability. It's the only fiber allowed on all wooden bows (except some models) because it doesn't put great stress on limb hooks and wooden handles. It is difficult to control because it changes constantly in length, especially on hot and humid days. Today some allied polyester fibers are on the market offering the performance of regular polyester with greater strength and less stretch. Inexpensive *Dacron* is the preferred choice for these older or lightly constructed recurve bows. *Dacron* may also be used for compound bows where the cables are still made of steel.
- **Aramid (Medium Cost).** A popular class of high performance fiber are the aramids, the most well known being **Kevlar** (a Dupont trademark). More susceptible to UV damage and breakdown due to folding and flogging, but much stronger than polyester, aramids present no creep or stretch. Due to unexpected failures and a short life cycle, aramid fibers have been replaced by newer and more reliable fibers.
- **LCP (Medium Cost).** Vectran is a high performance, thermoplastic, multifilament yarn spun from Liquid Crystal Polymer (LCP). **Vectran** is the only commercially available melt spun LCP fiber. It exhibits exceptional strength and rigidity, five times stronger than steel and ten times stronger than aluminum. A natural aramid replacement, also comes with unexpected failures which limit its use to compound cables. LCP has no stretch, no creep, outstanding cut resistance, minimal moisture absorption and high abrasion resistance.
- **HPPE (Medium-To-High Cost).** High Performance Polyethylene (HPPE) has a unique combination of properties. Its density is slightly less than one, so the fiber floats on water. But its tenacity can be up to 20 times that of a good quality steel. **Fastlight**, **Spectra** and its European counterpart **Dyneema (DynaFlight)**, the most well known products, offer very low stretch, high strength, good UV resistance, and much less strength loss in flex than Kevlar or Vectran. Although used on almost top brand bows, as cables and strings, creep is always a concern

with this class of fiber, even in the new ones like HPPE 2000, which offers 20% less creep than normal HPPE.

- **Composite Blends (High Cost).** To address the unexpected failures found on no creeping fibers (aramids and LCP), some manufactures have blended with great success Vectran and HPPE. The best known are **S4 by Brownell and 450 Plus by BCY**. These composite blends offer the archer the durability of HPPE with a much needed characteristic for modern bows, no creep. Their strands are a little larger in diameter than HPPE, so you will need fewer strands. With these fibers bowstring strength is never a problem.

Creep. Creep is when the string stretches. Creeping is the nightmare of any competitive archer, because it causes different string lengths over time. But don't be too concerned of that with modern fibers, even if they exhibit some creep, bowstrings will stretch to their final length after you shoot 200 or 300 arrows.

Fiber Cycle Life. Only with aramids and Vectran are unexpected failures a problem. So if you decide to use them, replace your bowstring very frequently and, even so, expect some failures. With polyester, HPPE, and composite blend bowstrings, replace them every year, or if you shoot a lot replace them 3 to 4 times a year. Take special care with the cables of compound bows. Any time you doubt your compound cables or string, or your recurve string for that matter, replace them. If you shoot outdoors most of the time, your string and cables lives will be shorter due to sunlight (UV deterioration).

Fiber/String Maintenance. With any type of fiber you will need to wax them to get the most from the string in cycle life and performance. Caring for those fibers is easy, no magic wax is needed. Just use standard bowstring wax as you have done in the past with polyester or HPPE. The only exception is the LCP's where you will need a specially formulated synthetic wax.

What About Serving Choice? The servings role is to protect the bow string from premature wear and, on the center serving, to give correct nock fit. There are several serving materials on the market, but basically they come in following types:

- *Nylon serving.* The first serving material available and still excellent for end serving and tying peeps. #4 – diameter 0.021"
- *Braided serving.* Thinner than nylon serving, but weaker. #3 1/2 - diameter 0.019"
- *Monofilament serving.* Several diameters 0.015", 0.018", 0.021", good for center serving and easy to match nock fit.
- *HPPE serving.* Probably the finest end loop serving. Normally strong two-ply construction, excellent abrasion resistance. #2 – diameter 0.022"
- *Composite braided serving.* Outstanding durability, excellent for center serving, ten times the life of monofilament.

Number on Strands. For compound bows, it is best to see your manufacturer's recommendations for the bow string and cabling. From the recommended strand size you may add or reduce 1 to 2 strands to suit your shooting style. Below is a sample of string size that you could use for some of the string material in the market (recurve bows only). Note: Adding more strands to your string will make it stronger but reduces arrow speed.

Bow Weight	Number of Strands for Recurve Bows			
	Dacron	Fast Flight	S4	BCY 450
20 - 25 lbs	8	14	7	10
25 - 35 lbs	10	16	8	12
35 - 45 lbs	12	18	9	14
45 - 55 lbs	14	20	10	16

What is creep compared to stretch?

Answer: Creep is non-recoverable elongation, unlike stretch which is basically elasticity or recoverable elongation. Some elasticity is necessary. Creep is a problem. It can cause the bow to go out of tune and the peep to rotate. The draw weight can increase and the draw length can increase.

Question: Is it a fact that the lower the number of strands, the faster the arrow?

Answer: Yes on most bows but not all, and of course with today's extremely strong materials, a lower number of strands can normally be used safely.

Question: Is it necessary to use "special" wax with certain types of bowstring material?

Answer: Not really. There are four main reasons for using wax on a bowstring.

1. To lubricate the fibers and prevent "fiber to fiber" abrasion
2. To help keep the "bundle" of strands together
3. To maintain and extend the life of the string
4. To help prevent water absorption

Question: Is it okay to wax the serving material on a bowstring?

Answer: Yes, especially if a silicone wax is used because the silicone will penetrate through the serving into the fibers below which are tightly compressed so there will be help in improving durability.

Question: How many twists can be put into a bowstring?

Answer: There are three reasons for twisting a bowstring –

1. To keep the bundle of strands together
2. To shorten the string after creep has occurred (adjust draw length)
3. To correct peep rotation

On a standard compound bow, initially 10 – 20 twists is a suggested range. If you use a material that does not creep, no further twisting will be required. Obviously on single cam strings, more twists may be required. The recommended range is 20 – 40.

Question: Does twisting reduce creep?

Answer: Not really. Eventually polyethylene fibers such as Spectra and Dyneema, under high temperature and high tension, will creep. Twisting will take up the stretch (creep) that has occurred, but will not stop it continuing.

Question: What is the life of a bowstring?

Answer: This depends on many factors but primarily the number of shots and the condition of the equipment. If an archer is shooting a high poundage bow every day and

using perhaps a caliper release, the string should be checked very frequently. (Using a string loop will increase string life.) On a lower poundage bow, shooting fingers, the wear would be significantly less, therefore the life of the string much longer.