BOW STRINGS

Introduction

Frequently asked questions about bowstring and serving material are addressed in this Tech Forum. Please understand that there is not always one exact answer. A lot depends on the type of bow, the string length, the string type, the draw weight, how the string is made, and of course, a shooter's personal preferences. In this Tech Forum, we are trying to give general guidelines.
If you don't find the answer to your question on this page, you may email BCY.

Q: 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 or decrease and the draw length can increase or decrease.

Q: Are there any bowstring materials that do not creep?

Answer: Yes - 450 Plus, 452X and Trophy. These are blends of Dyneema® and Vectran. Vectran has no creep at the tension created by normal bows; therefore these materials are normally 100% stable.

Q: If these products have no creep, why would anyone use anything else?

Answer: Any archer needing maximum speed will find that a Vectran blended product is slightly slower than a 100% Dyneema® or Spectra product.

Q: What is the fastest string material that does not creep?

Answer: On most bows, we would suggest 20 - 24 strands of 452X or Trophy material in the string and the cable (or make the cables from 12 - 14 strands of 450 Plus). This response relates to compound bows with 55 - 75 lb. draw weight. A lower number of strands can be used on lighter poundage bows. Formula 8125 material and Dynaflight 97 are made from the latest and strongest Dyneema® material. In many cases, little or no creep will occur when using these materials and 8125 is the fastest. Many recurve shooters prefer 8125 or DynaFLIGHT 97.

Q: 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. Of course it is important to be sure that the centre serving is built up to allow a good nock fit when the number of string strands is reduced. Note also that at a certain point not too far below the manufacturer's recommended number of strands, it is quite likely that the archer will notice an increase in vibration directly after release because there is not enough mass in the string to absorb the "elastic energy" that occurs when the arrow is released.

Note that HMPE products like Dyneema® and Spectra are prone to creep more if fewer strands are used. "Elevated temperatures and higher draw weights increase this problem."

Q: Are there string materials that are better on some bows than others?

Answer: Bow manufacturers make their choice of string material based on many criteria but primarily safety and performance. Performance - meaning speed, low or no creep, vibration,

and durability. Bow manufacturers do extensive testing. Some put a higher priority on certain criteria than others but they are all very conscious of safety.

Q: Can you use a different string than the type supplied with the bow directly from the factory?

Answer: Normally yes, unless there are some strict recommendations not to by the bow manufacturer. Check to be sure it does not void the warranty if a different string is used. Be sure to get the right number of strands of the new material you plan to use.

Q: 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 fibres and prevent "fibre to fibre" 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

Bowstring material manufacturers normally apply a generous amount of synthetic wax in liquid form, which insures that from its origin the bowstring material is well lubricated inside and out. It is this process which gives the material its basic protection from fibre to fibre abrasion and helps keep the bundle of strands together. Generally the type of wax used would be a good quality standard "tacky" wax. At this stage it would be unusual for the wax to include silicone which is very slick and, particularly in the case of Flemish strings, makes it difficult to convert the bowstring material into a finished bowstring. However, after the string is made, it is recommended that the archer look for a "maintenance" wax that contains some silicone because a wax blended with silicone penetrates the string material very well and keeps the inside fibres lubricated as well as the outside. Wax can be applied with fingers, with a cloth, or with chamois leather. It should be applied frequently and rubbed well into the string.

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

Answer: It is best to restrict waxing serving except on extreme wear areas. The centre serving on a Crossbow needs to be kept lubricated but there is no need to wax compound / recurve centre servings.

Q: 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 .5 to .75 twists per inch is a suggested range; meaning on a 60" string, you should apply 30 to 45 twists. 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 because the string is longer. We have found that a higher twist level reduces peep rotation.

Q: Does twisting reduce creep?

Answer: Not really. Eventually polyethylene fibres 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 from continuing

Q: Is there any difference in the durability of a string made from coloured material instead of black or white?
Answer: No.

Q: Are there any benefits in a braided bowstring as opposed to the standard twisted product?
Answer: We produced braided bowstring material many years ago and have looked at it many times. Generally braided material is expensive. It does not improve the creep characteristics of the bowstring and normally reduces arrow speed.

Q: 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 a calliper 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. But again, it is the archer's responsibility to check the string and keep it waxed. There are no rules. We know that with the high quality synthetic materials being used today, many thousands of shots can be achieved. Archers should also check for tell-tale signs of problems such as abrasion (fuzziness), high strands (which indicate a strand breakage underneath the serving), or excessive peep rotation - which can be an indication that one strand may have broken.

There are many reasons for string breakage. One of the most common is burrs in the cams / wheels. It is the archer's responsibility to check the string carefully prior to shooting every time. As stated, many thousands of shots can safely be achieved if the string is checked and maintained properly.

Q: How do I make a zebra string?
Answer: You can't. It is a patented product made by Mathews from a specially constructed material. You can make standard two colour strings.

Q: What is the best centre serving to use?
Answer: No. 62 braid, a blend of Spectra and polyester, grips well and has high durability. It should suit most archers. It is available in three diameters - .018, 021, and .025. Also offered is 62XS serving which is similar to regular 62 but with a higher percentage of Spectra for even better durability. Many finger shooters (compound, traditional and FITA) prefer our Halo, 100% braided Spectra material.

Q: What is the best end serving to use?
Answer: On traditional bows, No. 400 nylon is a good bet. For something more durable, our new Halo is quite popular.
For the ends on modern compound bows, twisted Spectra material is usually the best. Look at our No. 3D. It is the smallest diameter end serving and fits comfortably into the cam / wheels without riding up on the side walls causing abrasion. Our black No. 3D has a slight adhesive coating which helps it stay together around the loops.

No. 62 braid and 62XS are also being used as an end serving material, usually in size .018". It is less prone to slippage and serving separation, however the archer must determine if durability is sufficient. Halo .014 is getting very popular because it is small and tough, and fits in those small cam grooves on compound bows.

Q: How tight should serving material be applied?

Answer: Tight enough to hold the serving in place and stop it separating. That is not very specific but what it means is that if you serve too tightly, there may be problems. In the centre, you are crushing the bowstring material which can cause problems at a point where flexing occurs, and at the ends, if the serving is too tight, it "cracks" open when bent around the cam, especially if the bow is fitted with a radical cam. So experiment with serving materials which offer some adhesive coating for the ends such as our black No. 3D, Halo 014 and 62XS - 018".

Q: What is the difference between Spectra and Dyneema®?

Answer: Not very much. Both products are HMPE (high modulus polyethylene) materials. This product was originally developed by DSM in Europe and licensed to Allied Chemicals for production in the United States. BCY introduced Dyneema® to the archery market in 1995 with its DynaFLIGHT bowstring material which was made from SK65 Dyneema®. In 1997, DSM began manufacturing SK75, a higher strength Dyneema® with less creep, and BCY introduced this with DynaFLIGHT 97 bowstring material in 1997.

There are some slight differences in the two products, Spectra and Dyneema®, which really do not affect the performance as an archery bowstring. These would be the number of filaments and the actual makeup of the yarn. In general, SK65 Dyneema® is equal to Spectra 1000 and SK75 Dyneema® equals Spectra 2000. Note that Spectra 2000 is not available in heavy size yarns needed for making archery bowstring material.

The main benefits of Spectra and Dyneema® over other fibres previously used in archery bowstrings are their extremely high strength and durability. The high strength results in very low creep.

Technical information about both products can be accessed through the Internet if you are looking for additional technical data. There are just the 2 genuine producers of Dyneema® and Spectra. One Japanese manufacturer is licensed to produce a Dyneema® product. HMPE from China is not Dyneema® or Spectra.

Q: Does 452 fray?

Answer: All bowstring material will fray or fuzz if it is not properly maintained, meaning regularly waxed, so I guess the question is - Does 452 fray more than other bowstring materials?

Early production of 452 bowstring material included fibres lubricated with silicone. It was found that the silicone would not blend with our standard bowstring wax applied during manufacturing. This caused 452 material to dry out quickly and a dry string will fuzz of fray.

The fibres are no longer lubricated with silicone. We now use a special lubricant which blends well with our current production wax. This means that the 452 stays well lubricated, therefore no longer will it fuzz or fray. All current productions of 452 will show no more fuzzing or fraying than any other bowstring material. 452 is now called 452X. This also applies to the new Trophy product.
Note also that the percentage of Vectran in 452X and Trophy is approximately 33%. The lower the Vectran content, the higher the durability, the faster the arrow speed, the longer the string life and the greater the safety. The right percentage of Vectran stops the creep.

Q: Do bowstrings provide the same performance on different bows?

Answer: No. It is generally accepted that small diameter string materials of 100% Spectra or Dyneema®, such as 8125, will shoot faster, but of course stability also has to be considered.

The width of the wheel tracks and design of the compound bows can make a difference. Some bows have very wide and friendly wheel tracks and speed tests have shown that blended materials such as 452X and Trophy are not much slower than 8125 on these bows.

On some compound bows, particularly those with narrow wheel tracks, the use of string material with a high percentage of Vectran has resulted in problems such as sudden catastrophic failures.

So, the answer is really that any opinions given by archers on string material relate directly to the bow they are using and it is wrong to assume that the results will be the same on other bows.

Question: What is the difference in strength between Dynaflight and 8125? I previously made my strings and cables out of Dynaflight. My strings were made with 16 strands and cables were 14 strands. Now I have started to use 8125 in which I made a string consisting of 18 strands, and I am wondering if 14 strands for a cable would be strong enough because of the smaller diameter. Could you tell me which is faster and more durable, no.2d.016 end serving or no.2s.018 end serve?
wer: Both DynaFLIGHT 97 and 8125 are made from the highest quality Dyneema® yarn. 97 with its larger diameter is about 23% stronger than 8125, so 18 strands of 8125 would give you similar strength to 16 of 97. Both materials have excellent durability.

We recommend 18 strands of 8125, perhaps 20 in your cables, but consider putting 452X in your cables.

8125 is the faster string material.

If you use too few strands, you are likely to get some "creep"; particularly on the high poundage bows at high temperatures.

Regarding end serving, our 3D and 2S have similar strength and durability. The 3D is popular because of its smaller diameter and 3 ply rounder construction; it seems to serve tighter. Halo .014 is another option with a very tough, small braid.

Q: Bowstring material used to be made from Dacron, then from Fastflight. Now we see Dyneema®, Spectra and HMPE. What are these materials and which one is best?
Answer: HMPE means "High Modulus Polyethylene". Spectra and Dyneema® are both HMPE material. BCY uses mostly Dyneema® for Bowstring material and Spectra for serving material. Products described as HMPE are made from either Spectra or Dyneema®. Spectra and Dyneema® are both very, very strong. Breakages are rare with either material. However, less creep (stretch) will be experienced with SK75 Dyneema® because it is stronger. Breakages can occur because of abrasion, rough spots at the ends of the bow, etc., but not because of fibre strength if the correct number of strands is used.

Which is best? Bottom line.....our opinion.....its Dyneema® SK75, which is the strongest HMPE yarn available in suitable sizes for bowstring material. BCY uses either 100% SK75 Dyneema® or a blend of SK75 Dyneema® and Vectran in all bowstring materials. We've recently added SK78 for Crossbows.

Question: What is the best bowstring material for a modern Recurve bow?

Answer: First it is essential to be sure that the bow is designed to shoot with the modern, high tenacity bowstring materials. Any doubt, use Dacron to avoid limb tip breakage. Which string material is best for recurve bows? It's not an easy question. We know top recurve shooters are using our 8125, our 452X and our DynaFLIGHT97; and by top shooters we mean people like Vic Wunderle, Butch Johnson, Ed Eliason, and Simon Fairweather. So there's really not a clear recommendation, but we see a preference for Dyneema® which offers high strength and durability. Less strands can be used on lower poundage recurve bows, which helps arrow speed, particularly if the draw length is short.

Q: What is the best bowstring material for a Crossbow?

Answer: 100% Dyneema® is recommended for safety and speed. This leads to DynaFLIGHT97. -26 or 28 strands are normally used. Creep is not normally a factor due to the extremely high strength of the string, but now you also have the option of Force 10 Crossbow string which has the same size as D97 but even less creep. Use our braided Spectra crossbow serving and 2S or 3D end serving.

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