



JOYCE JAGGER

THE EMBROIDERY COACH

Keeping The Thread Tensions Balanced On Your Embroidery Machine

Thread tension is one of the most frustrating subjects within the world of embroidery. Learning to adjust and maintain good thread tension is a learned skill. Once you develop this skill it will make a huge difference in your finished embroidery. Very often a design would look so much better if only the tension was adjusted correctly on the machine. The wrong tension can cause multiple problems and without the basic knowledge of the relationship between the top and bottom threads it is impossible to know how to correct them.

A stitch is formed when the needle carrying the top thread passes down thru the needle hole in the needle plate and connects with the bobbin thread. A loop is formed directly behind the eye of the needle. As the needle is coming back up the thread will tighten if your tensions are set properly. If one of your threads is too tight it can snap. If there is a burr on the edge of the needle hole in the needle plate, as the thread is coming back up, it can split or fray. It is important to keep a total balance between your Upper thread (top thread) and your Lower thread (bobbin thread).

The top thread can be any one of four basic thread types. Your tension will differ with each type.

- Rayon
- Polyester
- Metallic
- Cotton

There are other specialty threads available but the most popular ones used in today's market are the ones mentioned above. Your tensions will vary within each type so as you change types even within the category; you must check your tension.

Rayon thread has been the most popular thread used within the embroidery industry, but polyester is quickly becoming the thread of choice with most embroiderers. Polyester is a stronger thread but it does not have as high a

sheen as the rayon. The manufacturers of Polyester thread have been working very hard on the composition of the polyester thread to develop the same sheen as the rayon thread. Many embroiderers claim that they can run their machines faster creating a greater volume of finished products with fewer thread breaks. In my own experience, I have not found this to be true; it is more about getting the right tension on your embroidery thread and keeping the thread tension balanced. If you are working with a customer that is going to be bleaching their garments, you need to use polyester thread. If you are working primarily in the corporate market and the garments are going to a commercial laundry, polyester thread is a must.

Polyester Thread

There has been many improvements made to the polyester thread in the past few years, but you must make sure that you are running your tensions much tighter when you are using this thread. It has a tendency to stretch and leave loops far more often than rayon thread. It is easier to maintain a more consistent tension with the rayon threads, but if you are constantly running polyester thread on your machine then this is not the case. Polyester thread is bleachable and the primary choice for the sports market, children's clothing market and corporate market where hard laundry detergents are being used such as the medical industry.

Metallic Threads

Metallic threads can be a little harder to use but learning to control them is most of the battle. Metallic threads are wiry and a little thicker than either the rayon or polyester. You will run a looser tension and use a needle that has a larger or longer eye. It is also important to reduce your stitch count in the area of the design that is being sewn with the metallic thread. The metallic threads that are made today are of better quality than the ones from several years ago. This is an area that you do not want to skimp on. Metallic thread is expensive, but the ones made by the better name thread manufacturers usually do run much better. I personally use one by Robison-Anton and I have no issues with their metallic thread. It seems to run just like any other embroidery thread with no kinks in it that are so common to metallic thread.

Quick Tip: Run your metallic thread thru a packing peanut before threading it into the eyelet on your thread rack. This will keep it from kinking. I learned this trick many years ago and that alone saved a lot of frustration. If you will follow these guidelines, you should not have any difficulty using metallic thread and it is a great addition that you can offer your customers. Many

embroiderers shy away from metallic threads because they are having constant thread breakage.

Cotton Thread

Cotton threads are very low luster and have been used mainly by the monogramming industry. It is not as easy to find the cotton threads today as in the past. Many of the suppliers have discontinued these threads. There are fewer colors available in the cotton threads, but they are highly sought after in the heirloom market.

Adjusting Threads When Switching Thread Types Or Colors Of Cones

The thread tension needs to be adjusted each time you change a cone of thread. It is not a good idea to keep switching back and forth with your thread types. The machine gets used to one type of thread and when you make a change you start to have problems. It is best to maintain your colors on the same needles if you can. If this is not possible, stay with the light-colored threads on the same needles and the dark colored threads on the same needles. For example, don't change off a white thread with a navy thread. You will definitely have to adjust your tension. This can make a big difference. The dyes are heavier in the dark colors than they are in the lighter colors, so therefore the thread is slightly heavier.

Adjusting Tension For Different Types Of Garments

The same tension for a cap does not always work on a knit golf shirt. As a general rule, I run the tension tighter for a cap. This is not always the case, depending on the fabric that is in the cap. You will need to experiment to see which fabrics require a tighter tension than others.

Birdnesting

This is a lot of top thread that gathers up on the underside of your garment and forms a big wad. This is caused by the top thread tension being too loose. You will see loops on top of your embroidery and this will even cause your garment to be pulled down into the hole in the needle plate.

Obviously this will rip the garment. At times, you will need to reach up underneath the needle plate in the hook area and cut this wad of thread loose from the garment in order to remove it. If this bird nesting does occur you must make sure that you have removed every strand of thread that has been caught in the knife and bobbin case and in and around the rotary hook. If

some of this thread gets caught in the hook when you start to sew again, your hook may freeze up and you are shut down until you either replace your rotary hook or have a tech replace your rotary hook. You can also knock out your hook timing as well as the knife timing mechanism if a wad of thread gets caught in it.

Tension Too Tight

If the tension is too tight, you may experience a lot of thread breaks or see bobbin thread that is being pulled up onto the topside of your garment. It looks like you have very erratic or jagged stitching, but when you look more closely you are actually seeing the white bobbin thread showing at the outer edges of your stitching.

Correct Tension

When your tensions are correct, you will see three fairly evenly divided sections on the back of your lettering or embroidery in each segment. The center section will be the white bobbin thread and the two outer sections will be the top thread. If you are embroidering small letters it is sometimes hard to see the division, but you still should see the line of bobbin thread. If you do not, your tension needs to be adjusted. If you are embroidering a large fill area, you will see mostly bobbin thread with a small amount of top thread showing at the edges of the segment. Keeping a total balance between the top and bobbin threads not only makes your embroidery look better, your machine will run smoother and you will have fewer problems with your machine.

Adjusting The Top Tension

To adjust the top or upper thread tension, you start with the top Tensioners on your machine. You must be careful that you do not have this set of Tensioners too tight. If they are too tight, the thread will pop out from under the tension disks as you are sewing and all of a sudden your thread is looking very loose and you don't know what happened or what could have caused it. You did not physically make any changes in your settings, but your tension changed during the sewing process. This is the first place to look if that happens. If this is happening, loosen this top set of Tensioners, by turning or twisting the knob to the left or counterclockwise a quarter turn. If they are too loose, you will turn or twist the knob to the right or clockwise.

If you do not see a difference after adjusting the top set or it still is not correct, adjust the second set of Tensioners or Rotary Tensioner on the front of the machine. You will turn the knob to the left or counterclockwise to

loosen your tension and if you want to tighten your tension, you will turn or twist this knob to the right or clockwise.

I have adjusted tensions for the past 32 years and learned the correct feel of the thread passing thru the needle as I pulled on it. Today there is a top thread Tension Gauge that you can purchase to properly set your tensions. The first time that I used this gauge I was amazed at what a great job it did and I also found out that my tensions were not all set properly. After using this gauge, my machine actually sewed better and faster without any problems. It is such a great feeling when you can sew all day long with little or no thread breaks.



Testing With The Top Tension Gauge

To test your tensions with this Tension Gauge, you will thread your machine properly making sure that you have followed the upper thread path correctly. Pull a few inches (about 6 inches or so) of thread thru the needle and wrap it around the hook of the gauge at least twice. You want to make sure that it is caught enough that you can pull on your thread without it coming loose. With the numbers on top of the gauge facing up you will pull the thread straight out horizontally. I have a video on my website showing you how to use it.

Do not pull out more than 18" to 24" during your test.
The tension should read 100-130 grams for Rayon thread
120-150 grams for Polyester thread

On my machines, the upper range of these numbers work better than the lower range. Start with needle #1 and continue the same process until you have completely tested all of your needles. Each time that you make an adjustment, you should perform this test.

(Each machine has its own personality and sometimes these measurements will not be correct for your machine. You will need to experiment and arrive at your own measurement and keep your track of what these measurements

are. Many times they will need to be tighter than the measurements listed above in order to have the correct tension.)

(Another side note here: Each time a tech comes in to work on my machine, he loosens all of the top thread tensions and I have to go back and redo them when he leaves. Obviously you are not going to have as many thread breaks if your tension is loose. My point here is that just because the tech has been there and adjusted your tensions, do not think that they will automatically be correct!-Trust me, I am not knocking techs, they are wonderful, I just want you to be aware of your tensions if they are not correct after the tech leaves!)

Bobbin Thread

There are 3 basic types of threads used for bobbins in the embroidery process.

- Polyester
- Cotton
- Nylon

Polyester is used by most of the industry. There are 2 types of polyester bobbins.

- Continuous-Filament Polyester
- Spun Polyester

I have found that you do not want to risk using inexpensive bobbins for your embroidery. Do not be fooled by thinking that you will get more for your money with bobbins that are low priced. They are made from less expensive bobbin thread and are not consistent in the way that they run. Many times you have to throw away the last 20% of the thread on the bobbin because of the way that it is wound. Trying to run your production with inexpensive bobbins can really slow you down because of thread breaks or uneven tensions.

The Continuous Filament is the most popular in the US and the strongest of the 2 types of polyester bobbins. The Continuous Filament can leave a waxy build up in the bobbin case if it is an inferior thread. Many embroiderers have switched to the Spun polyester bobbin because of this factor, but it is not as strong. The Spun Polyester bobbin acts like a cotton bobbin but does not leave the heavy lint deposits that the cotton bobbin is known for. You do not have the even running consistency with the Spun Polyester bobbin that you have with the Continuous Filament bobbin.

The nylon bobbins are stronger and more expensive, but it is difficult to maintain good tension.

Prewound Bobbins

It is advisable to use prewound bobbins rather than trying to wind your own. They are very inexpensive, wound tighter, work more efficiently and usually run smoother and more consistent. Winding your own bobbins is truly a waste of time.

There are many versions of prewound bobbins.

- Magnetic Core (sideless-they are wound on a magnetic core)
- Cardboard sided with magnetic strip on one side
- Cardboard sided
- Sideless bobbins (these are wound on a core without the paper sides)

My personal favorite bobbin is the magnetic bobbin called the Fil-tec bobbins. Sometimes the sideless bobbins do not work at all in some machines, even with the magnetic core. This bobbin usually runs all the way to the end of the core and I do not have much bobbin thread waste at all.

Check Your Tension When You Change The Bobbin

Every time you replace your bobbin, you need to check the tension. The tension can vary and be different on each bobbin. Your tension can even change within the bobbin. It is very normal for the tension to change when it gets close to the end of a bobbin. The last 10% should be considered unusable. This is especially true with the cardboard sided bobbins.

All of a sudden as you are sewing, you will notice that even though nothing has changed in the embroidery process or your garments, your tension has changed. This is very upsetting. At the first sign of this, remove the bobbin, throw it out and replace it. Again, check your tension to see that it is correct before you start running your machine.

Clean Out Bobbin Case

Each time you change your bobbin, clean out the bobbin case with a brush or blow it out and check the tension spring/clip on the top edge. Lint and dirt build up inside of the bobbin case and under this spring. Your tension will run too loose and it does not matter how much you tighten the screw, you will not get a good tension until you have cleaned this out.

Cotton bobbins produce more lint than polyester bobbins and tend to create the most problems. To clean out the tension spring/clip gently run a piece of heavy paper underneath the spring/clip. The corner of a business card works well. Be very careful when you are doing this that you don't dislodge the spring/clip. The spring/clip has a small lip so that fits into a groove on the left side on the top of the bobbin case. Make sure that it is still in this groove when you are finished.

Do not clean it out with a pin. You can scratch the bobbin case, and this will create more problems.

Check Your Bobbin Tension Following These Steps

- Hold the bobbin in your hand with the thread hanging down on the right side.
 - Place it into the bobbin case with open side of the bobbin case towards you.
 - Pull the thread up thru the tension spring/clip but do not run it thru the pigtail.
 - Pull out a few inches of thread while you are holding the bobbin case in the palm of your hand.
 - With your other hand, pick up the bobbin carefully and suspend it, holding on to the thread. Hold it just above the palm of your hand. It should not drop.
 - Gently tug on the thread and bob it up and down. It should drop a small amount. If it does not drop at all it is too tight. If it drops easily, it is too loose. It should only drop a small amount when you are bobbing it.
- Make sure that you do not have the thread pulled up thru the pigtail when you are trying to perform this test. The bobbin will fall out of the case.***
- If the tension is too loose, turn the largest screw on the bobbin case to the right a small amount. If the tension is tight, turn this screw to the left. Perform this test again each time that you adjust the screw.



After you have completed your test, you can run the thread thru the pigtail and place your bobbin case into the rotary hook of the machine.

There is also a **Bobbin Tension Gauge** that you can purchase to set your

tensions correctly. I strongly advise purchasing one of these valuable items. They are a bit pricey, but really do a great job. This is a one-time investment of approximately \$80.00 but it is worth its weight in gold. The measurement for the correct bobbin tension using the gauge is 18 to 20 grams. The numbers to read on some of the Tension Gauges will be between 180 and 200 instead of the 18 to 20. It is easy to use and very accurate. I have a video on my website showing you how to use it.

Check Each Garment As You Are Removing It From The Embroidery Machine

When you are running a job, check each garment as you remove it from the machine to make sure that your tension is still correct. This is very easy to do, it only takes a second and saves a lot of frustration later on. As you remove the hoop from the machine, quickly flip it over to check the backside of your embroidery. You are looking for anything strange such as bad tension, no bobbin thread showing at all, and too much bobbin thread showing and sometimes you can even have an area that did not sew. At this point you can put it back into the machine and repair it. Once it is out of the hoop it is much more difficult to do this. This process is very quick once you get into the habit of it.

QUICK NOTE: If you have a multi-head machine and you discover a problem with one of your garments as you are taking it off of the machine, write the number of the machine head on the backing of that garment so that you know which head it was on. Not all heads work exactly the same and it is important to put that hooped garment back onto the head from which it was removed.

What Do I Do If I Have Taken All Of These Steps And My Tension Still Is Not Correct?

Clean out the tension disks in each of your tensioners. Take a Q-tip doused in alcohol and remove all of the dirt and lint buildup. This is something that should be done routinely about every 6 months if you use your machines on a daily basis. If you only use them part time, you should clean them at least once a year. Sometimes you will have to remove them entirely and soak them in alcohol because there is so much dirt built up behind them that you cannot get it all out especially if you have had your machine for a few years and have never cleaned them out.

I had one client that were ready to throw their 12 head embroidery machine out because they could not get the tensions correct no matter what they did.

After I took a look at it, I discovered that the tension disks had never been cleaned. After cleaning them, their machine sewed like new. Three years later, the machine is still there and sewing!

This is a very important maintenance step that many people forget about or aren't even aware of. Put it into your routine maintenance schedule. I know that this is an article on thread tension not machine maintenance, but they all go together. **Without a regular machine maintenance schedule, you will never have good tension or the machine performance that you are looking for.**