



JOYCE JAGGER

THE EMBROIDERY COACH

“How Important Is Embroidery Underlay Stitching?”

Is Underlay Stitching a mystery to you? Do you get so confused as to which underlay you should be using that you spend hours experimenting to come up with a design that finally works, or you are sort of satisfied with?

Underlay stitching in your embroidery designs is extremely important and today I am going to take the mystery out of it for you.

Underlay stitching in every embroidery design is very important. When you are creating a design including basic lettering, underlay stitching is the absolute foundation of that design. Without underlay stitching your designs and lettering will not look like high quality designs. This is a subject that is often overlooked.

I searched and searched for answers about underlay stitching when I was spending hours trying to come up with the right combinations with the issues that I was having when I was creating designs. I wanted top quality designs and it took me a long time before I finally found the right solution and I could not do it on my own. It took the right teacher to help me understand what underlay stitching was all about and how to create it.

I kept hearing the term, Embroidery Underlay Stitching but I really have no idea how important it is and how to use it.

I was so confused and did not know how to get the answers to the questions that I needed, and these are the same questions that I keep getting from embroiderers today! So, I totally understand.

I attended several workshops at tradeshow and spent many hours experimenting with different settings, but I just could not get it.

I finally contacted a digitizing expert and asked him if he would teach me. I traveled to St. Louis, Mo and paid him to work with me. After spending 5 days with him, I finally was able to understand and grasp the concept of embroidery underlay stitching, push and pull compensation and the right density settings along with how to use each one for the different types of fabrics.

Those 5 days cleared up all of my questions and really made creating designs so much easier, and less stressful! He used the Wilcom software and during his class I had Wilcom on my laptop to use. In my business, I used the Pulse software. At night, after working with him, I went back to my hotel room and worked in the Pulse software. What he was teaching me were the fundamentals of the settings, what it was all used for and I finally was able to grab the concept of all of it and it was the best 5 days I have ever spent on any type of business training. Not only did I learn it in the Wilcom software, it was easy to translate it to my Pulse software and now I can look at anyone's software and help them because of his teaching me the basic fundamentals and the why's of it all! That was huge.

Until I fully understood how to create the right Embroidery Underlay Stitching and apply it to my embroidery designs, creating a single embroidery design to my satisfaction took many hours and was extremely stressful.

Once I had the basic fundamentals and the why's of it all, understanding which type of Underlay Stitching to use in any type of design or lettering was easy and made perfect sense.

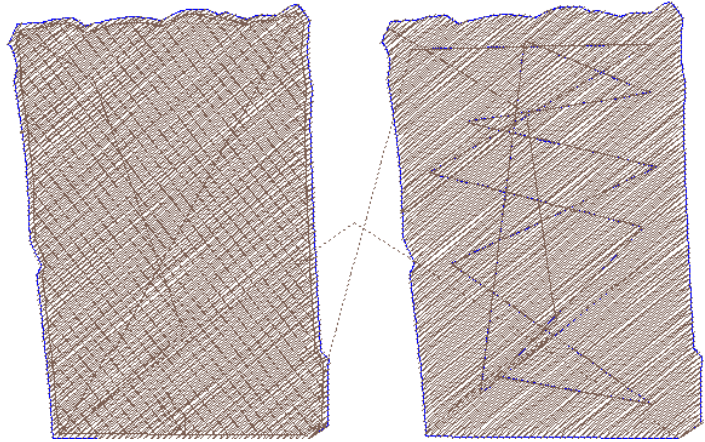
I am going to be dividing this training up into 2 parts. In the first part of this training, I am going to talk about:

- **The 5 Basic Functions of Embroidery Underlay Stitching**
- **The 4 Basic Rules of Embroidery Underlay Stitching**
- **The Different Types Of Embroidery Underlay Stitching**

In the second part, I am going to be going into the software and show you how to actually apply it in different types of scenarios.

What is Embroidery Underlay Stitching?

You might be wondering, what is underlay stitching if you are new to embroidery and embroidery software. Embroidery Underlay stitching is the stitching that is sewn on your fabric first before the actual top



stitching is sewn. Sometimes they will follow the same line as your embroidery and sometimes they will look very strange to you if you are new to embroidery and are not familiar with Underlay. It depends on what type of Underlay you have chosen but we will talk about that later.

We will start with the 5 Basic Functions of Embroidery Underlay Stitching.

1. **It attaches the garment to the backing creating a stable surface and smooth platform for the top stitching.** You will want to use a small running stitch for this. The shorter the run stitch the tighter it will hold the fabric and backing together. By that I mean a 2.5 millimeter run stitch and make sure that you place a lock stitch at the beginning of your run stitch so that it truly attaches the garment and fabric together. This also helps to prevent your thread from pulling out of the needle. I'm sure you seen the issue where the design starts sewing and it leaves a long thread because it did not get caught, this is because there was no lock stitch at the beginning of your run.
2. **It helps to reduce the amount of give in the fabric.** This will help to keep your design in good registration and decrease the Push and Pull factor created by the pulling of the thread. The underlay will act as a barrier and keep each area of your design well defined. If your running stitch is too long it will allow too much movement between the fabric and backing. It will shift as it is sewing. This is more prevalent in large stitch count designs.

3. **It hides the color of the fabric that will be covered with stitching.** Using a long run stitch such as a 3 millimeters to 4 millimeters stitch length will cover the fabric much better than a shorter stitch such as a 2 millimeters. If you are sewing a large fill area with a dark color thread on a white fabric you will want to create a contour or edge run underlay with a small run stitch such as a 2 to 2.5 millimeters and then change your stitch length to 3.5 to 4 millimeters for the remainder of your underlay that will cover the entire area. This lifts the thread off of the fabric hiding the color underneath.
4. **It helps to reduce the density of the top stitching.** It is a misconception that underlay increases your stitch count. If you do not use underlay you have to increase your density and your embroidery becomes very stiff and hard. I'm sure that you have heard the term, bullet proof!
5. **Stops the fabric from puckering.** If you are using a heavy density and no underlay, your garment will pucker around the embroidery after it has been laundered. It will sometimes roll up and is very unsightly. This issue really shows up on t-shirt fabric. Embroiderers complain a lot that they cannot embroider on T-Shirts because the design always puckers up especially after it is washed. That is because they have not used the proper underlay and sometimes no underlay at all.

The 4 Basic Rules about Embroidery Underlay Stitching that are important for you to learn!

1. **The Stitch length will vary depending on the purpose of it or the size of your object or letter.** The default stitch length for the run stitch underlay in some software packages is 2 millimeters and others like the Tajima DGML software is 2.5 millimeters. A run stitch length of 2.5 millimeters is a good general base to work from. You may need to reduce this size to 2 millimeters or even 1.8 millimeters if you have a small letter or object that has a narrow column. This will help the underlay stitching to hug closer to the curves of the inside of lower-case letters such as a's, b's, d's, e's, and etc.
2. **Your Underlay Stitching must be consistent and not randomly laid down in order to be effective.** Do not use 1 pass or line of underlay in one letter and 2 passes or lines in another unless your software is

creating an additional line as it is traveling from one part of the segment or letter to another. A lot of this depends on where you have placed your Start and Stop points, but that is another subject.

Underlay that is not even on the edges or not the same distance from the edge on one side of the column as the other will cause the column to look uneven on the side that the underlay is set in too far.

- 3. Underlay Stitching can be increased or decreased depending on your fabric color or type.** When your design looks sparse or thin, increase your underlay density before you increase your top density. You increase your density by decreasing your number in the density box on your underlay page. (Example: the default is -52.9 spi in the Tajima by Pulse software. This is telling you that your actual underlay density is 10.6 stitches per inch.) To increase your density, change your number to -45 spi. This equals 18.5 stitches per inch. If this is not heavy enough decrease that number again to maybe -35 spi. This would work on a very heavy thick towel.

In the Wilcom software the density is controlled by spacing. If you want to increase your density you are going to decrease your spacing. (Example: if the spacing is set at 3 millimeters, you will want to change it to 2 millimeters.) This will decrease the spacing between your stitches.

Some other programs have a sliding scale to control the density. You need to figure out in your program how to increase or decrease your underlay density. Run off a sample to see if this is the look you want.

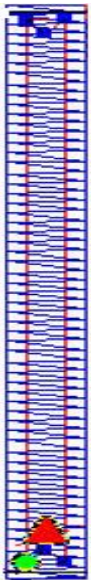
- 4. The Underlay Stitching must be created for each object or letter at the same time that the object or letter is created.** Do not create all of your underlay and then go back and create the object or letter. Fabric shifts and they may not follow the same path. If I am not getting the effect that I want, I will create additional underlay after I create the object because it is not doing what I want it to do and then I will move it to be in front of the object where it belongs, but I will complete that before I go to the next letter or segment.

The Different Types Of Embroidery Underlay Stitching

There are 3 different stitch types that are used in creating underlay in your embroidery design.

- Run stitches
- Zig Zag stitches
- Fill or Tatami Stitches

These 3 different stitch types make up the 5 basic types of underlay stitches. These can be applied by hand if you are digitizing your own design or they can be applied automatically if you have this capability within your software. Sometimes you cannot get the same effect using the auto functions in your software so you need to know how to apply the different types by hand so that you get the exact effect that you are looking for.



Contour or Edge Run/walk - This creates a running stitch along the edge of the letter or the segment that you are creating. It is also known as an Edge walk or Edge run stitch. This type of underlay is used to create a roll over edge for your lettering or object. It is used with a Satin Path letter or Satin path column that is over 1.5 millimeters wide and in combination with Lattice for a Complex Fill or Tatami stitch. It helps to give you a smooth edge on textured fabrics such as pique.

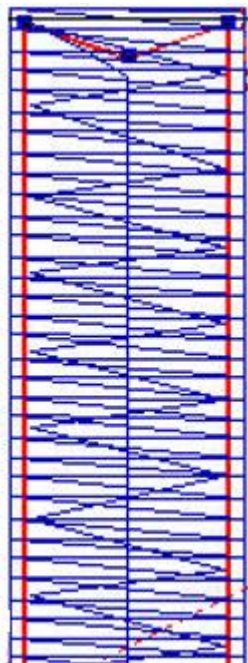
If it is too close to the edge the run stitches will pop out. You have seen this I am sure. When a design is finished you are left with some run stitches that are hanging out from the edge and you need to trim these off in order to save the design, but it really never looks good.

The distance from the edge of your top stitching to the Contour or Edge walk underlay run stitch is your inset distance or margin. To move your run stitch closer to the center of the letter you would increase your number in the inset distance or margin box. From experience, I have found that .50 millimeters is a good basic setting to start with. If you see some run stitching peeking out from under your top stitching you may want to increase this number. (Example: If it is set at .50 millimeters - change it to .60 millimeters. This will move it in.) Run another sample to check and see if this number is large enough.



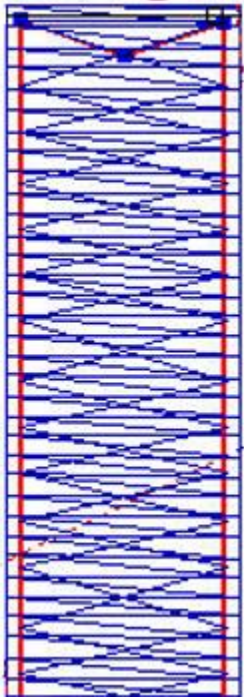
Perpendicular or Center Run- This underlay runs down thru the center of the column. It is also called Center Run underlay. This underlay is used when you have a very narrow letter or column that is less than 1.5 mm wide. For that you will only use 1 line or pass of underlay down thru the center. In the Pulse software, the default is 2 lines or passes.

This underlay is good to use in combination with contour when you have a wider column and need a little extra for lift in the center of your column. In the Pulse software, you can add as many lines as you like depending on the size or width of the letter or object. I have personally used this combination on heavy rough textured types of fabrics such as Carhart jackets with excellent results.

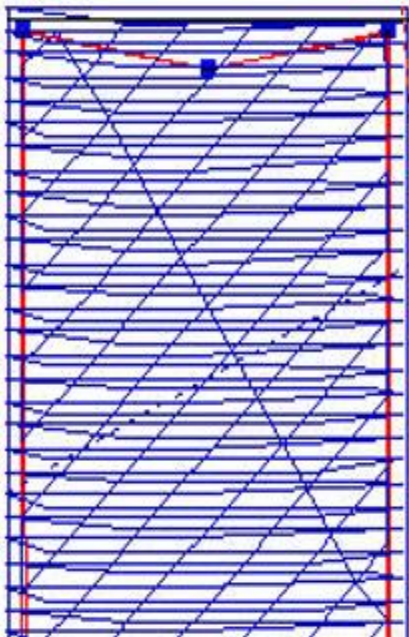


Parallel- This underlay is created using Zig Zag stitches or run stitches with square ends. In some software programs it is called the Zig Zag underlay. This can be used on a lightweight terry cloth or fleece. You can increase or decrease the amount of density in your Parallel underlay. It is much better to increase the underlay stitch count rather than the top stitching stitch count. You will end up with a smoother look and better coverage.

You can also control the inset distance of the underlay in relation to the edge of the top stitching. The distance between the outside edge and the edge of the underlay is your inset distance or margin.



Zig Zag - This type of underlay is the same as the Parallel except it has twice the amount of stitches. It runs down the column and then up the column creating twice the amount of stitches as the Parallel. In some programs, this is known as a Double Zig Zag. This is a better choice for terry cloth and pique. You may even want to increase your density if you are working with an extra heavy terry. This will lift the top stitching off of the fabric and help to keep it from sinking into the loops of terry cloth. You may want to increase the density of your Zig Zag underlay to give your top stitching a puff or rounded appearance. It also creates an even surface for the top stitching. It works well in combination with the Contour underlay on pique. You can also control the inset distance or margin of the underlay in relation to the edge of the top stitching.



Lattice or Tatami- This underlay is a low-density fill stitch used underneath Complex Fill stitches or Tatami stitches, depending on which program you are working in. Lattice is usually used in combination with the Contour or Edge walk underlay. It runs at a 45 or 90-degree angle to the top stitching in a lattice form. It helps to reduce the pulling up of the fabric as it is stitching and to keep your stitches in good registration especially if you are going to add a border. It will help to keep the border in the proper place.

Type: **Edge run** ▾

Length: 2.20 mm

Vary run length

Min length: 0.80 mm

Chord gap: 0.05 mm

Margins

1 2 3

0.35 0.35 0.35

Second Underlay

By segment By shape

Type: **Zigzag** ▾

Spacing: 3.00 mm

Length: 2.00 mm

Angle: 90°

Margins

1 2 3

0.20 0.20 0.20

FX Save ?

Type: **Edge run** ▾

Length: 2.20 mm

Vary run length

Min length: 0.80 mm

Chord gap: 0.05 mm

Margins

1 2 3

0.35 0.35 0.35

Second Underlay

By segment By shape

Type: **Zigzag** ▾

Spacing: 0.50 mm

Length: 2.00 mm

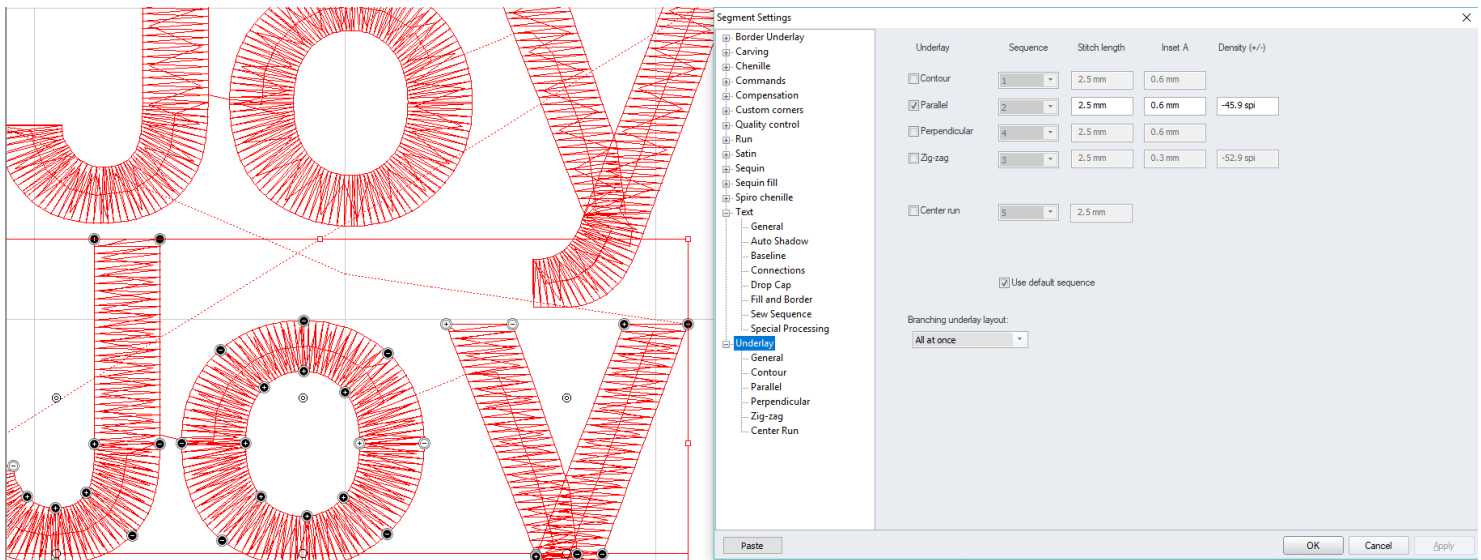
Angle: 90°

Margins

1 2 3

0.20 0.20 0.20

FX Save ?



Recap

Now let's recap what we covered. We covered the basics of what Embroidery Underlay Stitching actually is. Embroidery Underlay stitching is the stitching that are sewn on your fabric first before the actual top stitching is sewn. I talked about the 3 areas that are going to help you figure out which ones to use.

- **The 5 Basic Functions of Embroidery Underlay Stitching**
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- **The Different Types Of Embroidery Underlay Stitching**

I hope that this has helped you to understand embroidery Underlay Stitching a little bit better. I know that this subject is huge and tough to grasp but in our next lesson, I am going to go into the detail of each of the different types of underlay stitching and show you how it is applied to the different types of segments in a design and to lettering.

This is going to make it a lot easier for you to grasp and understand exactly what to use and why you are using it.