

# *Weaving: The Complete Process* *From Thread to Cloth*

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People often ask me. “How long did it take to weave that?”

The answer I usually give is that the actual weaving, that is, the act of throwing a shuttle back and forth across the loom, is about 10 percent of a complex process. This process includes a lot of planning and preparation before the weaving phase begins, and a number of finishing steps after the last thread is woven.

My reason for writing this document is to make it easier for anyone who is not a weaver to understand the process and to visualize the steps that are necessary to the process.

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## *Form Follows Function*

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The first step in any weaving project is to decide what the cloth's purpose in life will be. The intended function of the cloth guides the weaver in choosing the appropriate thread or yarn. For example, the yarn I use to weave a rug needs to be thick and hard-wearing, and the cloth must be stiff and flat. It must not roll up at the edges and trip everyone who walks on it, or if it is to be hung as decorative art, it must lie flat against the wall. A scarf, on the other hand, or any cloth worn next to the skin, should be smooth, soft, and very drapey so it conforms to the body.

Because I weave primarily scarves and shawls, and my personal preference is for fine rather than bulky cloth, I choose very thin thread in natural fibers that are comfortable to wear next to the skin. Silk, lyocell, rayon, cotton, and fine soft wool such as Merino are good choices.

There is no set standard for the size of a scarf - some people prefer long and narrow, others prefer a shorter, wider shape. The size of the wearer makes a difference, too. At six feet tall, I am likely to wear a longer, wider shawl than a woman five feet tall. Some women like to do the Isadora Duncan fling, with a dramatically long scarf wrapped around the neck once or twice. Some scarves look best simply draped over the shoulders. Some scarves have long, twisted fringe, others have short, straight fringe or just a simple hem.

In any case, I must make decisions about length and width and end treatment before starting to weave, because these factors determine the amount of thread I'll need. The design, or pattern, of the cloth also has an impact. What's the scale of the pattern? Do I choose a nonrepeating pattern? Two repeats? Ten repeats? Fifty repeats?

Once I've decided what thread to use, I use two kinds of software to help in the planning and design phase:

- A spreadsheet helps me calculate the amount of yarn I'll need. You'll see an example in Figure 1 on the facing page.
- Weaving software lets me program the design of the cloth into the computer. Later, this same software will send the finished design to another computer attached to the loom. This means I don't have to remember each step of the design - which can be more than 2,000 threads long - the computer remembers it for me. Hey, this is why God made computers! Figure 2 shows an example of a design that you will see throughout this document in various stages.

**Yardage Requirements**

Finished Width (In.)	<input type="text" value="11.7"/>		Std Warp Waste	<input type="text" value="24"/>	
Finished Length (In.)	<input type="text" value="216"/>	=72*3	Std Warp Shrinkage	<input type="text" value="10%"/>	
Fringe (In.)	<input type="text" value="35"/>	=5*7			
On-Loom Width (In.)	<input type="text" value="12.87"/>		Std Weft Shrinkage	<input type="text" value="10%"/>	
On-Loom Length (In.)	<input type="text" value="302.5"/>				
On-Loom Length (yds)	<input type="text" value="8.40"/>				
Ends Per Inch	<input type="text" value="56"/>				
Picks Per Inch	<input type="text" value="40"/>		Warp Yd/Lb	<input type="text" value="8400"/>	
			Lbs Required	<input type="text" value="0.72"/>	11.54 oz
Total Ends	<input type="text" value="720"/>		Lbs Available	<input type="text" value=""/>	
Total Picks	<input type="text" value="9740"/>				
			Weft Yd/Lb	<input type="text" value="12000"/>	
Warp Yardage	<input type="text" value="6056"/>	3028.03	Lbs Required	<input type="text" value="0.29"/>	4.64 oz
Weft Yardage	<input type="text" value="3482"/>	1160.68	Lbs Available	<input type="text" value=""/>	
Total Yardage	<input type="text" value="9538"/>		Total Lbs Required	<input type="text" value="1.01"/>	

**Notes**

Warp length 9 yds                      need 3200 yds x 2:  
Warp = 20/2 Tencel                      dk blue, lt blue-violet

Weft = 30/2 tencel                      need 1700 yds x 3  
   teal, dk purple, leaf green

Figure 1. Spreadsheet for yarn calculation

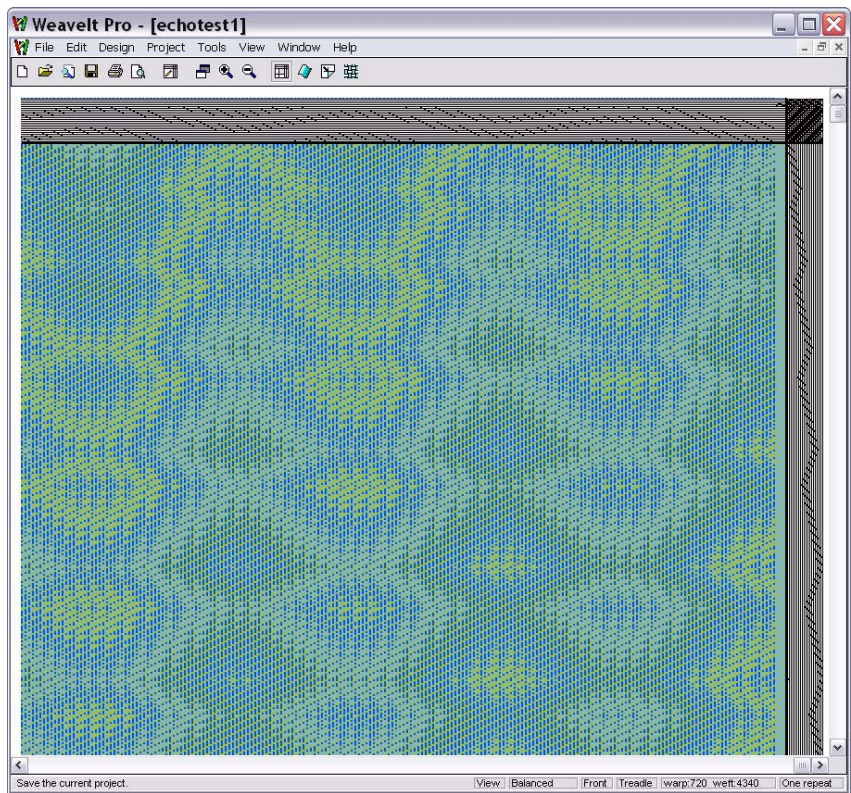


Figure 2. Weaving design software

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## *Dyeing the Thread*

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I usually buy undyed thread that is wound onto large cardboard cones. I must measure off the number of yards I'll need, based on the spreadsheet (with a bit extra just in case) and make skeins for dyeing.



Figure 3. Cone of white thread and a measured skein

Then I get to play in the dye-pot! The pictures on the next page show the dye process at various stages. For the project I'm planning, there will be two colors of warp threads, alternating thread by thread, so I'll dye half the warp yardage on one color, and half in the other. In this case, the colors are medium blue and deep blue-green.



Figure 4. Skein, pot, and dye supplies



Figure 5. Mixing dye



Figure 6. Skein in dye-pot



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## *Winding the Warp Threads*

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The warp, that is, the lengthwise threads in the cloth, must be measured out to the correct length for my project, and the threads must be kept in order so that they can be wound onto the loom properly. Since it's awkward to wind a warp with fine threads directly from a skein, I must first wind the thread back onto a cardboard cone. Then I begin winding the warp using a warping mill. Each thread follows the same path (based on a guide thread that is the same length as the warp will be) and is kept in order through the whole process.



Figure 7. Winding thread onto a cone



Figure 8. Winding the warp on a warping mill

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Once all the threads are measured out to the right length, and in the right order, I put a rod through the loop at one end of the warp and spread the threads out in a toothed board called a raddle. This allows me to get the warp onto the loom at the width of the finished project. Then I begin winding the warp onto the loom.



Figure 9. Spreading the warp in the raddle



Figure 10. Winding the warp onto the warp beam through the raddle



Figure 11. Warp brought forward over warp roller



Figure 12. The threading cross

The two sticks in Figure 12 maintain the threading cross, which helps keep those warp threads in the same order as I placed them on the warping mill.

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Here's a simplified drawing of the loom, so you can see the essential parts of the loom, and the path of the warp threads.

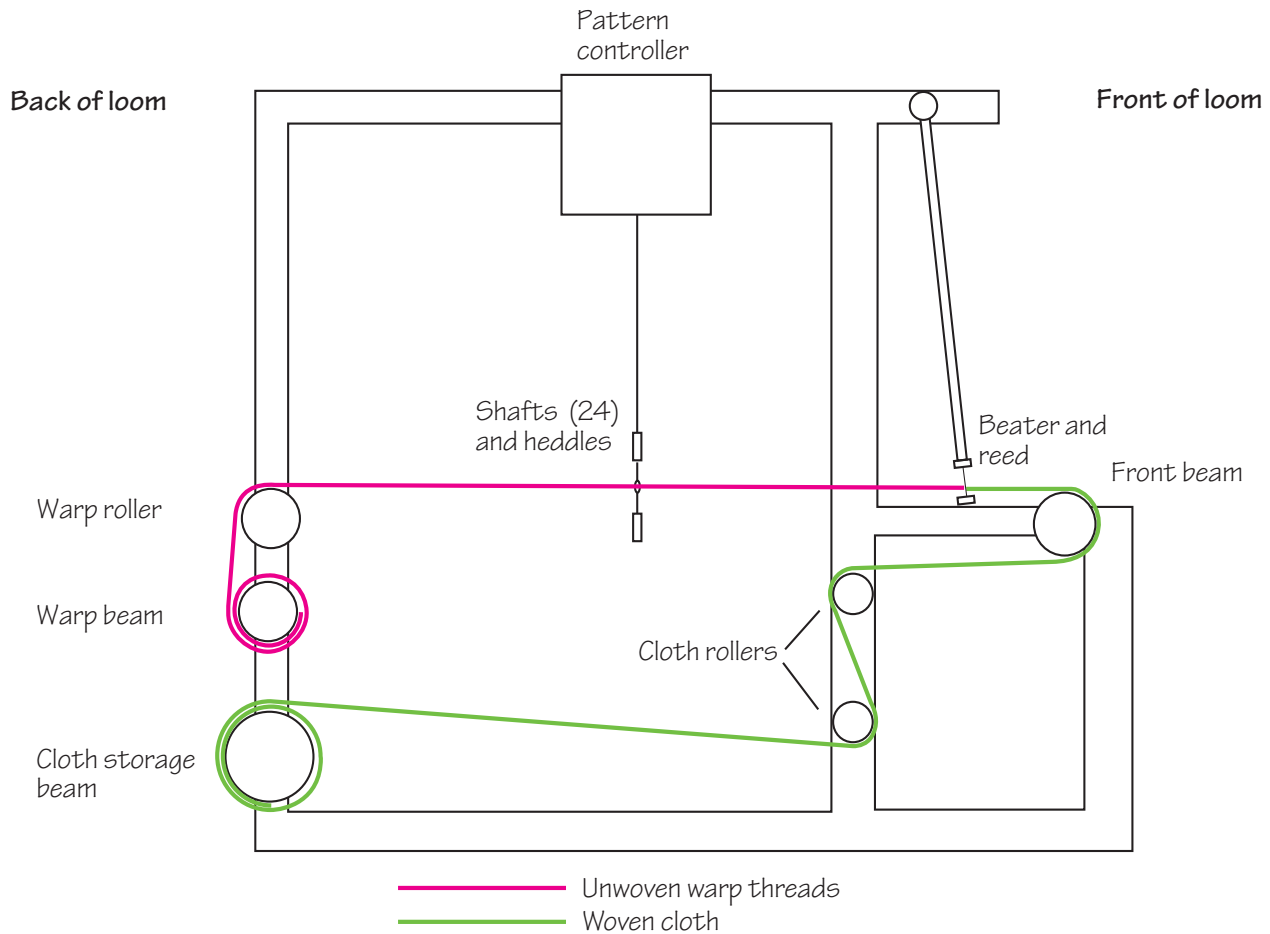


Figure 13. Essential parts of the loom

Now I begin what is for me one of the most tedious (but most important) parts of the whole process: threading the warp through the heddles on the shafts. Each warp thread must go through the eye of a heddle attached to the appropriate shaft, according to the pattern design. If I make a mistake here, there will be an unsightly break in the pattern.

The pictures on the next page show threading the heddles, drawing the threads through the reed, and tying the warp threads onto the apron rod. (The apron is a sheet of canvas that initially follows the path shown in green above. As weaving progresses, the apron and then the woven cloth wind onto the cloth storage beam at the back of the loom.) After tying on, I weave a few rows of waste yarn to check that the threading is correct and to space the warp threads evenly.





Figure 14. Threading the heddles

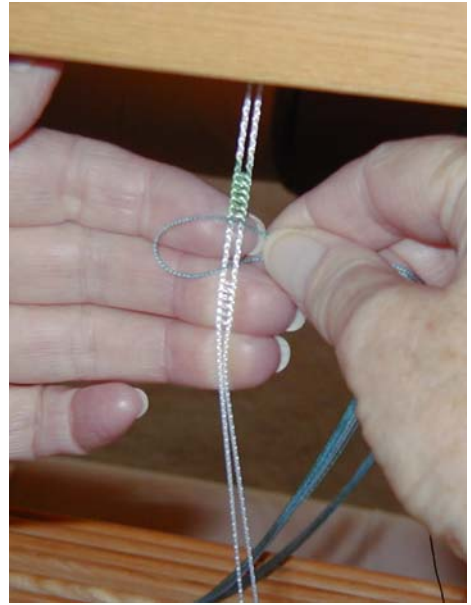


Figure 15. Threading (close-up)



Figure 16. Drawing threads through the reed with reed hook



Figure 17. Warp lashed onto apron rod; waste yarn woven in

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## Weaving

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Okay, now we've *almost* gotten to the fun part - weaving! First, I wind weft yarn onto a pirn, which fits into the fly-shuttle. The shuttle will carry the weft yarn across the loom, in the space created between threads that are raised and threads that are not.



Figure 18. Winding the pirn



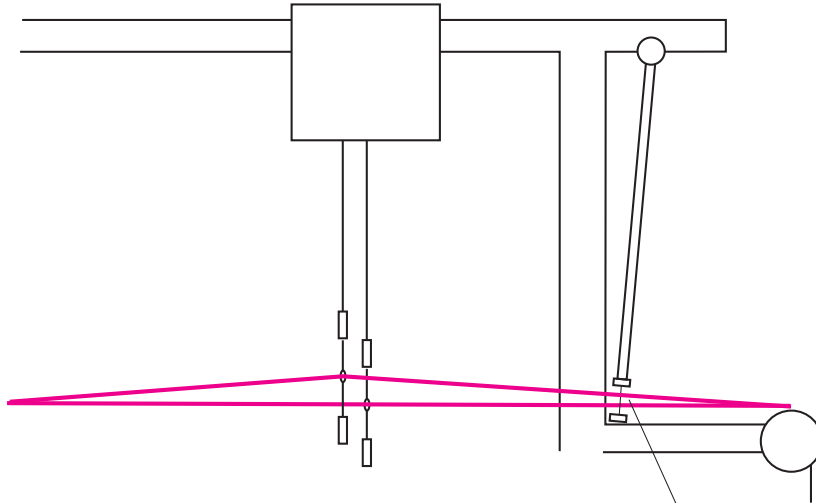
Figure 19. Pirn loaded in shuttle

By the way, I never warp the loom for a single scarf. I always make the warp long enough for at least 3 and sometimes 8 or more items. I leave enough length unwoven at the beginning of the warp for the fringe of the first scarf, weave the first scarf, leave enough warp unwoven for the second fringe of the first scarf plus the first fringe of the second scarf, weave the second scarf, and so on, one after another. This particular project used a technique I'd never woven before, so I only wove 3 scarves on the warp - some weavers call this "full-sized samples." Even though all items woven on that warp share the same warp threads, the weft color and the design can be different for each one, so each is unique.

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Here's a simplified drawing that shows the raised warp threads and the space through which the shuttle travels.

1. Pattern controller raises shafts according to programmed pattern, thus lifting all threads connected to those shafts.



2. Shuttle passes through space between threads that are lifted and those that are not. Beater then swings forward to press weft into place.

Figure 20. Pattern controller raises shafts, creating space for weft



Figure 21. Weaving begins



Figure 22. The pattern develops as I weave



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## Finishing

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After weaving, I cut the warp from the loom. If the scarf will have a plied fringe, I twist the fringe before washing and pressing the finished scarf. To twist the fringe, I make two little bundles of warp threads, one bundle in each hand. I twist both bundles in the same direction while letting them twist back on each other in the opposite direction. Sort of like patting your head and rubbing your stomach at the same time. It takes practice, and is hard on the hands, but it makes a lovely fringe for a silk or lyocell scarf. After the scarf is washed and ironed, I'll even out any group that is too short or too long.



Figure 23. Twisting the fringe



Figure 24. Finished fringe

I do use the washing machine and dryer on most of my scarves, to remove any excess dye and ensure that the article is pre-shrunk, so you don't have any surprises after you purchase it.

Here are some close-ups of the finished scarves woven on this warp, made by placing the cloth directly on the scanner bed.

