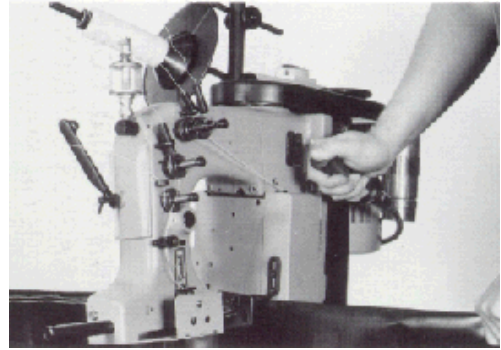


# GEOSYNTHETICS



## Quick-Reference Guide for the Sewing of Geosynthetics

**Question :** *How do I sew geosynthetics?*

**Answer:** It's surprisingly easy. Just follow these simple instructions.

First take the two pieces of geosynthetic fabric and hold the edges together to make either a prayer seam, "J" seam or butterfly seam (see page 3). Guide the fabric into the machine and depress the orange button to start sewing. The machine will then start stitching the fabric, and pulling the fabric into the machine on its own.

At this point, all the operator does is hold and guide the machine as the machine continues to feed the fabric on its own. The operator doesn't pull the machine along, the machine does that itself. Pulling the machine will cause the needle to bend, and that could result in costly downtime, broken needles, broken loopers, broken throat plates or loss of timing on the machine.

That's it. Pretty simple. Now here are a few helpful hints to increase your productivity.

**Sewing tip # 1:** Use three people. Three people make the job move faster and reduce the chance of job downtime.

The first person holds and helps support the weight of the two pieces of geosynthetic fabric and aligns the two edges of the fabric.

The second person holds and guides the sewing machine, being careful not to allow the weight of the fabric to put excessive stress on the sewing machine needle, causing the needle to break.

The third person helps support the fabric after it has been sewn and checks the quality of the stitching.

**Sewing tip # 2:** Two sewing machines at the job site. It is much less expensive to purchase a second sewing machine as a back up than to pay idle workers and idle earth moving equipment should the first sewing machine be down for maintenance.

**Sewing tip # 3:** Keep the wind from blowing the thread off the cones. On windy days, the thread may have a tendency to ravel off the cones. What you can do is cut the feet out of ladies's nylons, snip off the toe and put them over the thread cones to keep the thread cones to keep the thread from blowing in the wind.

**Sewing tip # 4:** There is a short learning curve using a sewing machine, so try to choose the same people to operate the sewing machine throughout the project.

**Question :** *What equipment do I need?*

**Answer:** Determine how and where you are going to use the equipment. Are you going to sew at the job site? Or will assembly be done somewhere else and then the geosynthetic fabric brought to the site? What are the engineering specifications of the project? Is the material light to medium in weight, or heavy weight? Your answer will determine what equipment you will need for the job.

**On the job site:**

1. Use a hand held machine with 3/8-inch capacity.
2. Use a sewing machine that sews a two-thread double locked stitch (Federal Stitch Type 401) for security of the stitch and seam strength and quality.



Federal Stitch Type 401

3. Use a machine with an adjustable stitch length. This gives you the versatility to sew different fabrics with the proper seam strength. Adjustments from 3 to 8 stitches per inch is ideal.
4. Use an electric motor for standard use, or an air-operated motor in hazardous conditions, such as sewing in the rain or sewing in or around water.
5. Be sure it can handle the hard knocks of your job site. Rugged, dependable construction is a must.

**Extra-heavy fabrics and off-site sewing:**



Be sure it allows you the option to sew both in the field or in the factory.

1. Use a machine for heavy-duty fabrics with a 3/4-inch capacity.
2. Use a sewing machine that sews two rows of stitching (Federal Stitch Type 401). The second row offers increased seam strength.
3. Use a machine with adjustable stitch length. This gives you the versatility to sew different fabrics with the proper seam strength.
4. Be sure it can handle the hard knocks of your job site. Rugged, dependable construction is a must.

**Additional equipment:**

1. Large thread stand for portable sewing machine to hold one-pound cones of thread so you can sew longer without stopping to re-thread.
2. MB100 Metal box that holds up to two portable machines, protecting them when they are not in use.
3. Suspension assembly for heavy-duty sewing machine to make it easier to handle on the job site.

**Question : What thread and seams do I use?**

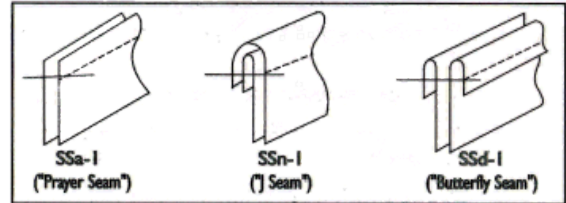
**Answer:** Contributing to the strength of your seam are the type of fabric you are sewing and the thread you are using. Fabric and thread suppliers can assist in determining the proper thread for your specific application.

Variables to consider when choosing the right thread are:

1. Does the finished seam need a certain strength?
2. Is the thread subjected to wet or dry conditions?
3. Is the thread subjected to ultraviolet light (surface use)?
4. Is the thread for use underground?

In addition, the number of stitches per inch (SPI) influences seam strength. Your optimum seam strength is dependent upon the fabric type and your SPI. Too few stitches per inch and the sewn seam may not be strong enough. Too many stitches per inch and the needle penetration may weaken the fabric, resulting in a "Zippering" or "tear along the dotted line" effect.

These are three different seam types used. 1) SSa-1 (prayer seam), 2) SSn-1 (J seam) and 3) SSd-1 (butterfly seam).



The project specification may indicate which type of seam to use for the job.

The number of rows of stitching is often determined by the job specification. Hand held machines make one row of stitches at a time. Heavy-duty, two-needle machines make two rows at once. A second row of stitching can be accomplished with the hand held machine by sewing the seam twice.

**Question : How much thread will I use**

**Answer:** The amount of thread you need for your project depends on the type of fabric being sewn. The chart and Formula below are helpful guidelines for determining how much thread you need for your project:

<b>Fabric Weight</b>	<b>Amount of thread* (401 Stitch)</b>
<b>Light</b>	<b>4 yards of thread for each yard sewn</b>
<b>Medium</b>	<b>6 yards of thread for each yard sewn</b>
<b>Heavy</b>	<b>9 yards of thread for each yard sewn</b>

\* Actual consumption may vary

**Thread usage formula for each row of stitching**

$$4+(2x(\text{thickness of seam})x(1/\text{length of 1 stitch})) = \text{inches of thread use per inch sewn.}$$

**Question : How do I care for a sewing machine?**

**Answer:** Let's face it, you are probably too far from the shop to fix it, so proper maintenance is essential.

1. Oil the machine at least twice each day.
2. Monitor the needle condition daily and change as needed.
3. Remove dirt, lint or any foreign material from the machine after each day's use, or more frequently if conditions warrant.
4. Keep extra parts on hand at all times, including needles, loopers, upper and lower knives and feed dogs.
5. And lastly, whenever possible, get factory training for your mechanic. Union Special is offering courses for maintaining and repairing these types of machines. Training will pay big dividends in the future by keeping your machines up and running.

**Machines for sewing Geosynthetics**

Union Special has been making industrial sewing equipment for over 115 years. Rugged and extremely dependable, our geosynthetic fabric sewing machines work even in the harshest conditions.

Below are some machines that are ideal for sewing geosynthetics:

### **Style 2200 hand held portable machine**



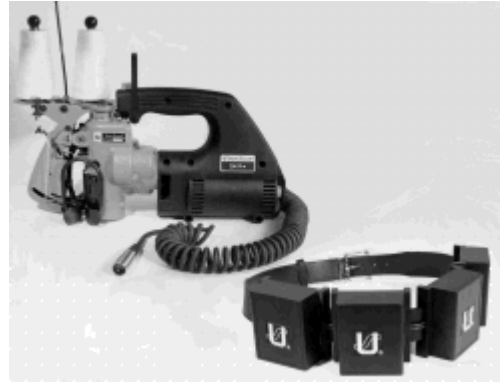
Ideal for sewing light to medium weight geosynthetics in remote locations.

#### **Features**

Rugged, portable unit  
Easy-to-adjust stitch length (3-8,5 SPI)  
3/8" sewing capacity  
Upper and lower fabric feeding mechanisms  
Double thread stitch type (Federal Stitch Type 401)  
Can convert to single thread stitch type (Federal Stitch Type 101)  
Electric or pneumatic motor  
1200-1700 stitches per minute

#### **Optional equipment:**

Thread stand to hold one-pound thread cones  
Metal box that holds up to two portable machines.



Picture shows the battery operated Style 2200MB

### **Style 80200Z2715A heavy-duty machine**



Designed for sewing heavy-duty fabrics off-site, or used on-site with an optional hanging assembly for supporting the machine.

#### **Features**

Easy-to-adjust stitch length (3-4 SPI standard, 5-8 SPI optional)  
3/4" sewing capacity  
Two-needles for sewing two parallel rows simul-taneously (Federal Stitch Type 401)  
9/32" spacing between rows of stitching  
Up to 1800 stitches per minute  
Eliminates wasted fabric from overlapping  
For in-plant or field use (tabling or hanging assembly optional)

Can be mounted horizontally or vertically.

Alternatively: **Styles 80800LA and LG**



One needle machines for 230V, single phase, 50 cycles or 220-240,380-415V, 3 phases, 50 cycles equipped with top lock spring balancer.