Application Guide

TAJIMA
USA Sales & Support
By Hirsch International Corp.

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Backing

Backings are customarily made out of either a non-woven polyester fiber that resemble paper or some type of woven fabric. They are placed under the fabric to be embroidered and are ordinarily hooped with the fabric. There are many reasons backing assists in creating quality embroidery. Different types of backings are used for different types of applications.

Why use Backing?

- **Prevent fabric from stretching while embroidering** – This is mainly a concern with knit garments, however, it is also common with garments such as leather.
- **Add Stability to the garment** – Although a garment may look good after it is embroidered, you must also be concerned with how it will hold up after being washed numerous times. A stable backing will help prevent puckering after a garment is washed.
- **Create a base for delicate items** – If a garment is too small to fit inside a hoop, you can hoop the backing and tape or pin the garment to the backing.
- **Adds crispness to small lettering and detail** – Even though a garment may have enough stability, adding backing may help to provide better registration on the embroidered good.
- **Reduce Friction** – A garment may be stable but using backing may help to allow the fabric to glide across the machine table as opposed to grabbing the table. For example, certain garments are coated on the reverse side. The friction during the embroidery process can cause this coating to heat up which creates a gummy substance, which will affect its interaction with the thread and needle.

Qualities of Backings and Uses Tearaway

- Tearaway backing is a non-woven fabric that easily tears in any direction.
- It is very simple to remove after embroidery.
- There are no remnants of the backing behind the garment once it is sewn.
- Directional tearaways will tear in only one direction thereby making it sturdier than typical tearaway backings. It is sometimes appropriate to use on unstable garments with low to medium stitch counts and densities.

Tearaway backing is traditionally used on stable garments such as denim and caps. Because tearaway backing is so easy to perforate, it is weakened with each needle penetration. This makes it a poor decision for unstable fabrics. It can be used on unstable fabrics such as knits in combination with a cutaway backing. The cutaway can be hooped with the garment for stability and the tearaway can be placed between the cutaway and the machine table. In this scenario, the tearaway is used to add crispness to small lettering and fine detail. Tearaway backing can also be used as a topping to provide better thread coverage on difficult color combinations. For example if you are sewing a white fill on a black garment, place the tearaway on top of the garment and allow the fill to sew over the tearaway. Tear away the backing after you have sewn the fill and before it sews a steil around the edges.

Cutaway

- Cutaway can be a woven or a non-woven fabric that must be cut away after the garment has been embroidered.
- It is generally a soft fabric that can be worn close to the skin.
- It must be cut from the garment with scissors. Extreme care is necessary when cutting the backing as not to damage the garment.

Cutaway backing is used predominately to stabilize a garment. It is used on knits, fleece and any fabric that stretches. A rule of thumb is if the garment stretches, you should use a cutaway backing. One of the downsides to cutaway is that you can see the backing through light colored shirts. You should always try to cut the backing away as close to the edge of the embroidery as possible without sacrificing the garment.

Specialty

Organza

- Organza is a thin woven nylon cutaway.
- It is sheer so it can be used on white or light colored garments.
- It is extremely tightly woven so it helps stabilizes the garment as well as helps to keep the embroidery crisp.
- Because organza is a nylon fabric, it can be irritating against the skin. To compensate for this, you should place a piece of thin cutaway or tearaway behind the organza.

Organza can be used on knit fabrics for stabilization.

No Show

- No show backing is a thin, light cutaway.
- It is a soft, woven fabric.
- Because no show backing is so thin in density, it is desirable on white or light colored garments.

No Show backing is a cutaway backing so it is used on knits and stretchy fabrics.

Fusible

- Fusible backing must be ironed on to the fabric you are sewing on.
- It produces an extremely stable sewing surface.

Fusible backing can be used on fabrics that require a lot of support. Because it needs to be ironed on it requires a little more preparation time, but the benefits of improved quality will reduce time in the long run. Fusible backing is often adhered to applique fabric to allow it to lay flat when it is sewn to a garment. Fusible backing is also a great idea for ultra suede or extremely stretchy fabrics.

Foam Cap Backing

- Foam backing is a thick foam made of synthetic materials.

Foam backing should be used on unconstructed caps. Because it is so thick, it helps an unconstructed cap keep form like a constructed cap.

Waxed Paper

- Common, everyday waxed paper makes a good backing for high thread count nylon materials.
- The waxed paper lubricates the needle to reduce friction.

Waxed paper can be used on garments such as nylon bags, golf bags, garments with existing appliques and leather. It can be ironed to leather to provide stability and then torn away.

Flame Retardant

- Flame retardant backing is a tearaway backing.
- It must be used in combination with polyester thread to protect the integrity of being flame retardant.

Flame retardant backing must be used on children's sleepwear and racing wear.

Topping

Toppings are as the name suggests an item that is placed on top of the garment to be sewn. Traditionally, toppings are water-soluble films. They come in a variety of weights. They are placed on top of a garment before embroidering and they can be torn off after the design is sewn.

Water Soluble

- Water-soluble topping must be removed from the garment with steam or water.

Water-soluble toppings should be used on velvets, velour, terry cloth, polar fleece, corduroy, fake fur, lace, lingerie and sweaters.

Hybilon

- Hybilon can be removed from a garment with an iron as opposed to water or steam.

Hybilon toppings are melt away making them the ideal choice for sewing on lace.

Back It Up & Top It Off

Do changes in today's fabrics mean changes in backing and topping requirements?

by Deborah Jones

Proper backing selection is directly linked to the production of consistent, high-quality embroidery. Yet, 100 embroiderers with identical criteria may choose several different backing and topping formulas to achieve successful embroidery results. There is no single correct option for backing a particular type of goods, because each option embodies a number of production trade-offs that can affect the end result. Similarly, properly selected, but often overlooked, toppings can add clarity to ill-defined embroideries. Experimentation and experience are the keys to topping and backing selection.

Backing Benefits

The guiding principles for backing selection go beyond the simple need for stabilization during the embroidery process. Some stable goods require no backing whatsoever, but the reasons for using a backing include:

• **Preventing fabric stretching during embroidery.** Although the notion of stretching the goods during embroidery is usually associated with knits, it is also common with other fabrics, such as garment leathers. Also, some lightweight goods, such as the currently popular sandwashed silks, need backing to support the weight of embroidery.

• **Added serviceability.** Just because an embroidered garment looks good when it leaves your shop does not mean the embroidery has the necessary support to hold up after repeated washings. Wash testing is important to determine backing suitability for cottons or other goods where shrinkage could create puckering.

• **Creating a base for hard-to-hold or delicate items.** Embroidery on items too small to be hooped by conventional means can be accomplished by pinning, taping or otherwise adhering the item to a base of hooped backing. And in some instances, heat- or water-soluble toppings can be used as a base for ultra sheer goods. These disappearing toppings can also be embroidered to create iron-on or sew-on embroideries that imitate the look of direct embroidery for goods that cannot be satisfactorily or practically embroidered. (For more information on this technique, see "Sticky Situations" in our September 1991 issue.)

• **Adding crispness to fine lettering and detail stitching.** Even when fabric stability is sufficient to maintain registration, the clarity of column stitching can suffer without suitable backing. This is also the primary reason for the application of embroidery toppings.

• **Reducing friction.** Some fabrics with excellent stability and high thread count require a backing to help them glide across, rather than grab, the embroidery machine table. For example, Cordura® nylon and similar goods are

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• Larger eye, and consequently larger dimensions in the groove profile, means improved thread protection and thread handling wren embroidering with heavy threads, special effect yarns, foil bands, Lurex or other metallic threads, etc..

• New scarf (clearance above eye section) to produce optimum results, and a specially designed area for the passage of the needle thread between eye and scarf. This design enables the needle to form a better loop and reduce the risk of skip stitches.

• Greater bending stiffness, due to a stronger supplementary shoulder in the upper blade part. Greater bending stiffness results in a more solid and accurate embroidery appearance, less miss stitches and needle breakage, lower maintenance and spare cost (machine parts are preserved due to less deflection of the needle).

• Point length - The DBxK5 has a slightly longer point, negligible in most instances. However, when extreme thickness of backing material, which also has to be sewn through, or due to longer feeding distances from stitch to stitch, this point may be too long. In this case needle system 287 WKH must be used.

On some occasions a needle with a short(er) shank may be required. For this purpose SCHMETZ is producing needle system 1738 KK SERV 1 / 1738 KK SA (Schmetz Canu 10:50). This system has the same technological features as DBxK5.

At present the following point forms and sizes are produced:

System and Point form	Canu	Size					
DBxK5	13:80 1	65	70	75	80	90	100
DBxK5 SD1	13:80 ME1				80	90	
DBxK5 SES	13:80 EB1	65	70	75	80	90	
DBxK5 SPI	13:80 MA1				80	90	
DBxK5 SUK	13:80 FBI	65	70	75	80	90	100
The following are short shank needles:							
1738 KK SERV1	10:50 11		70				
1738 KK SERV1 SES	10:50 EB11		70				
1738 KK SERV1 SUK	10:50 FB11		70		80		
1738 KK SA	10:50 11		70				
1738 KK SA G	10:50 FB11		70		80		

Other needle sizes upon request

coated on the reverse side. The friction of the embroidery process can heat this coating and cause it to become gummy, affecting its interaction with needle and thread. Place any tearaway backing, or even typing bond paper, between the goods and the machine table to help the goods slide as the pantograph moves.

Cutaway vs. Tearaway Backing

Tearaway backing is a nonwoven material that tears easily in any direction. This property makes its removal after embroidery extremely simple. *Cutaway backing*, as its name implies, is a woven or nonwoven that must be cut away from the face fabric. This procedure, by contrast, is quite a delicate one, with an inherent risk of damaging the garment in the finishing process. And haven't we all seen lightweight golf shirts with an unsightly patch of cutaway backing visible through the knit? Why then, does anyone ever use cutaway backing? Tearaway is faster and easier to use, but there are times when tearaway backing is not the best choice.

For example, tearaway has limited usefulness on unstable goods, because its support is diminished with each needle penetration. Once tearaway backing is perforated, it can be punched out, much like a paper doll, making it a poor choice for high stitch-count designs. This doesn't mean, however, that cutaway backings are the only alternatives.

Directional tearaway is a nonwoven backing that tears more easily in one direction than another. If you are one of those embroiderers who cruises the malls turning every embroidered garment inside out for inspection, you may have noticed this backing. Unlike a true tearaway, which tears away cleanly, tell-tale signs of directional tearaway use are the fuzzy bits of backing around the edges of the embroidery. Because it does not perforate as readily, directional tearaway may be suitable for certain low- to medium-density designs applied to unstable goods.

Fusible tearaway is another alternative for embroidering on unstable goods. The bond created by heat fusing the backing to the garment is surprisingly stable. There is no shifting or stretching of the fabric during framing or throughout the embroidery process. Although this additional preproduction step may appear time consuming and unwieldy, the benefits include reduced finishing time and reduced risk in the finishing process. In an attempt to save time, some embroiderers prefer to adhere standard tearaway to the reverse side of the fabric with a spray adhesive designed for embroidery use.

'New Age' Backings

Suppliers to the embroidery industry have responded to embroiderers' needs with the development of new backings. Today's backings are more diverse than ever, including a wide variety of weights and properties.

Tearaway products are available in several weights, from light and sheer to stiff and heavy; many embroiderers favor the new, crisp mid-weights. This category is particularly well-suited to low stitch count patterns with fine detail. Clarity of column stitches is enhanced with this backing, and it is often used as a bottom layer (next to the machine table), in combination with a soft cutaway backing.

Here's the concept: While unstable goods may require the stability of cutaway hooped with the fabric, this soft backing does not always provide crisp resolution on fine column stitching, such as small lettering. To accomplish this, a layer of tearaway is often simply slid between the hooped garment and the machine table, rather than being hooped with the cutaway.

Cutaways: There are two new cutaway backings in the marketplace that have been well-received. *Poly mesh backing*, from Accessory Resource Corp., Denver, is a refinement of a longtime favorite cutaway backing. Organza and similar synthetic goods have long been recognized as having superior qualities for backing sweaters and other highly unstable goods. Such sheer and lightweight goods make the problem patch of cutaway, often seen through knit shirts, a thing of the past.

Gunold + Stickma of America, Kennesaw, Gal, has also introduced a new cutaway backing — Stiffy 2035. An unusually fabricated nonwoven, similar to the lining found in disposable diapers, the textured backing is extremely sheer and supple, making it ideal for knits. Almost impossible to tear, the backing also has excellent resistance to stretching.

In A Pinch

In case you run out of backing or topping in the middle of a big job, here are a few home remedies that won't break your piggy bank.

Typing Bond or Kraft Paper: Smooth paper products allow gummy fabrics to easily slide on the machine table, and the weight can be selected according to the embroidery surface. Certain leathers and vinyls embroider well with kraft paper as a backing.

Waxed Paper: Common, everyday waxed paper makes a good backing for high thread-count nylons such as Supplex® and Taslon®. The needle is lubricated with each penetration of the paper, helping it glide through these tough, dense fabrics. You'll see this type of backing on many pre-embroidered fleece garments, particularly imports.

If you try waxed-paper backing in your shop, be sure to brush out your hook assemblies often, because residue from the waxed paper will collect there.

Paper Towels: Commercial-type, folded paper towels, the stiffer the better, can be used as a tearaway. Years ago, we used these towels in my father's embroidery shop to embroider across blue jean pockets from one edge to the other. Here's how: We caught just the top edge of the pocket in the top of the embroidery hoop and hooped the paper towel completely. Running stitches at the beginning of the program tacked the pocket to the paper towel, securing the pocket to a stable base. The pocket could then be embroidered from edge to edge with ease.

Plastic Wrap or Cleaners' Bags: Although not water soluble like its commercial counterpart, this topping can hold down the nap of corduroy, terry cloth, Polarfleece® and similarly fuzzy goods. Try this technique for the best results: Lay the plastic on the hooped garment and sew just the underlay stitching. Then, stop the machine, remove the excess plastic and restart the machine to complete the pattern. The rough edges of the plastic are covered by embroidery, and the topping remains with the garment to prevent the nap from poking through the stitches.

Gummed Tape: Some garment leathers that have a tendency to stretch can be backed with gummed paper tape.

Found in office supply stores, this tape looks and feels like brown kraft paper only it is backed with moisture-sensitive adhesive—like an envelope flap. Wetting the tape before applying it to the leather prevents the leather from stretching. The water-activated glue on this tape will not gum needles, and excess tape is easily removed from the back of the leather when embroidery is complete.

Tearaway Backing As A Topping: Following the procedure described above, use tearaway backing to achieve greater opacity, or thread coverage, on difficult color combinations. For example, a predominantly white fill area on a black background can be accomplished with fewer stitches if a piece of white tearaway backing is placed on the goods as a topping. After sewing the underlay, stop the machine to tear away the excess backing before completing the embroidery. This technique also works well using black tearaway on white or light-colored backgrounds. Even red tearaway is now available from some suppliers, including Gunold + Stickma of America.

Experimentation Is The Key

In today's rapidly changing embroidery market, we are asked to embroider a much broader range of fabrics than ever before. The embroiderer who wants to maintain standards of high quality should constantly test new techniques, both conventional and unconventional. While cost is certainly a factor, it shouldn't necessarily guide all buying decisions, particularly when backings and toppings are concerned.

Some of the best embroidery I have seen recently was on a T-shirt and a silk blouse. Both garments featured cutaway fused to the inside of the garment. Precut for the size of the embroidery, these fusibles weren't actually cut away after the embroidery was completed. The highly stable, featherweight fusibles preserved the supple hand of the garments, yet provided the necessary stability for the embroidery. This willingness to add a pre-production step helped create a serviceable and comfortable garment and eliminated the post-embroidery step of cutting away a more traditional backing.

So keep experimenting with backings and toppings and, by all means, keep turning embroidered garments inside out to check for new wrinkles in backing choices!

Deborah Jones has been in the embroidery industry for nearly 20 years. Currently, she represents Macpherson Monogram Inc., in Grand Pruine, Texas.

Backing Lends Support Behind The Scenes

by Cindy Sabo

That old sexist saying, "Behind every great man is a great woman," hardly seems relevant in this day and age. But a similar one certainly applies to embroidery: behind most great embroidered designs is quality backing.

As its name implies, backing is placed behind the fabric being embroidered to add support and to help maintain the crispness of a design after repeated washings. A garment without backing may shrink, causing the design to pucker — a word that strikes fear in the heart of every embroiderer.

It is important to use the type of backing that is most compatible with the unique features of both the fabric and the design being embroidered. Despite the vast array of backings available on the market, most embroiderers still use two basic types: tearaway and cutaway.

Tearaway is a non-woven fabric that tears in any direction. Some brands tear easier than others and some are *directional* tearaways, which tear in only one direction. Because tearaway is affected by the needle penetrations, it is not recommended for designs with a high stitch count but is preferred for shirt-front designs because it is easy to remove. However, be careful not to distort the design by ripping the backing away from the garment. If layers are used, each layer should be peeled away separately.

Cutaway can be a woven or non-woven fabric that must be cut away after the design is embroidered. The number of needle penetrations is not an issue with cutaway, but extreme care is necessary in cutting the backing away from the garment. It is a real tragedy to carefully embroider a garment and then accidentally cut a hole in the fabric when removing the backing. Stronger than tearaway, cutaway is ideally suited for fleece, a very soft medium. The high-stitch-count designs generally embroidered on a sweat shirt also require extra support.

If your shop specializes in shirt-front designs with low stitch counts, it may not be necessary to carry anything but a tearaway. However, if your orders span a wide range of garments and stitch counts, it may be wise to have both types on hand.

Most embroiderers use two layers of backing as a rule of thumb. A more stable fabric would use fewer layers and very light garments might need more layers. Many embroiderers also cross-grain layers of backing, putting one layer with the grain of the fabric going right to left and the other layer with the grain going up and down. If the fabric at hand is tightly woven, you might not need backing at all. However, if the item is a sport bag with a waterproof coating, backing would be used to reduce friction between the bag and the tabletop.

Another important factor is hooping the backing properly before the design is sewn. The backing must cover the entire inside of the hoop to provide stability—the key word to remember both during and after the sewing process.

Backing may look like an insignificant piece of cloth hiding behind the scenes. But without it, your design just might fall flat on its face.

Backing To Basics

TEARAWAY must be strong enough to support the embroidered design but must tear easily in either the horizontal or vertical direction without putting stress on the garment or the embroidery. Low cost, reduced handling time and diverse applications make this product a popular backing material. Tearaway is available in various weights and is suitable for almost all applications. It should not, however, be used on delicate fabrics or sweaters.

CUTAWAY provides the most stable base for delicate fabrics, sweaters and stretch knits. Its soft hand makes it ideal for embroidering designs that will be worn close to the skin. As the name implies, it is necessary to trim any excess cutaway with scissors; extreme care should be used in this process to avoid damaging the fabric.

POLY MESH is a fine-gauge woven polyester used to add strength without bulk. It is suitable for any fabric that requires special stabilization Because poly mesh is a lightweight backing, it is the right choice for embroidering on fine knits. It is particularly useful in preventing stress-point holes and eliminating the awkward "badge of cutaway."

FUSIBLE is an alternative backing used for embroidering on unstable goods or for applique designs. The bond produced is surprisingly stable, as there is no shifting or stretching of the material in either the hooping or the embroidering process. Despite the heat-fusing step, which may seem time consuming, the benefits of fusible include reduced time and reduced risk in the finishing process.

Source: Madeira USA

Needles

There are several variables to consider when selecting a needle. Specific needle considerations are needle size, needle point and system number. There are also specialty type needles that may be coated for particular applications.

Needle Size

There are two types of numbering conventions for embroidery machine needles. There is the European (Metric) numbering system and the American (Singer) numbering system. The Metric system is determined by multiplying the diameter of the blade by 100. For example, if the size is 80, then the diameter of the blade is .8mm multiplied by 100. The Singer numbering system gives the needle an arbitrary number. Both numbers are usually found on a box of needles. Here is a comparison of needle sizes.

Metric	65	70	75	80	85	90	95	100	105	110
Singer	9	10	11	12	13	14	15	16	17	18

Needle Point

Needle points can be either round or wedge. Round points are the most common and come in two variations, sharp and ballpoint.

Sharp – Sharp needles are the most popular variety. They are used on tightly woven garments such as towels, denim, caps and canvas. Sharp needles pierce the fabric rather than push apart the fibers.

Ball Point – Ball point needles move the fibers of the fabric aside without cutting them. They are used on delicate fabrics such as knits and fleece.

Wedge – Wedge point needles cut fabric as they penetrate. The point is more oval than round and reduces friction while piercing the fabric. They are used primarily on leather and tough non-woven fabrics.

System Number

The system number is an additional way of describing needles. This number represents the total length of the needle as well as variations in the size and shape of the needle eye. Different systems are recommended for different machine manufacturers. Changing system numbers may require changing timing on your embroidery machine.

16x257 – This is a standard high-speed sewing machine needle. Its shaft is slightly longer than some other needle systems. It is recommended for Melco machines.

DBxK5 – This needle is similar to a 16x257 needle but is designed with a needle eye one size larger. The shaft length of this needle is shorter than the 16x257. It is recommended for Tajima machines.

DBx9ST – This needle is the same as the DBxK5 but the needle eye is one size larger. It is two sizes larger than a 16x257. It is recommended for very thick embroidery thread.

DBx7ST – This needle is similar to the DBxK5 but it has an elongated rectangular needle eye. It is designed specifically for metallic threads to prevent fraying.

287 WKH – The eye of this needle is similar to the DBxK5 needle. It has a longer shaft than the DBxK5 so the systems are not interchangeable.

15x1 – This is a needle specifically designed for smaller embroidery machines. It will not work on traditional embroidery machines.

Coated Needles

There are two types of needles available on the market today which are coated for better durability.

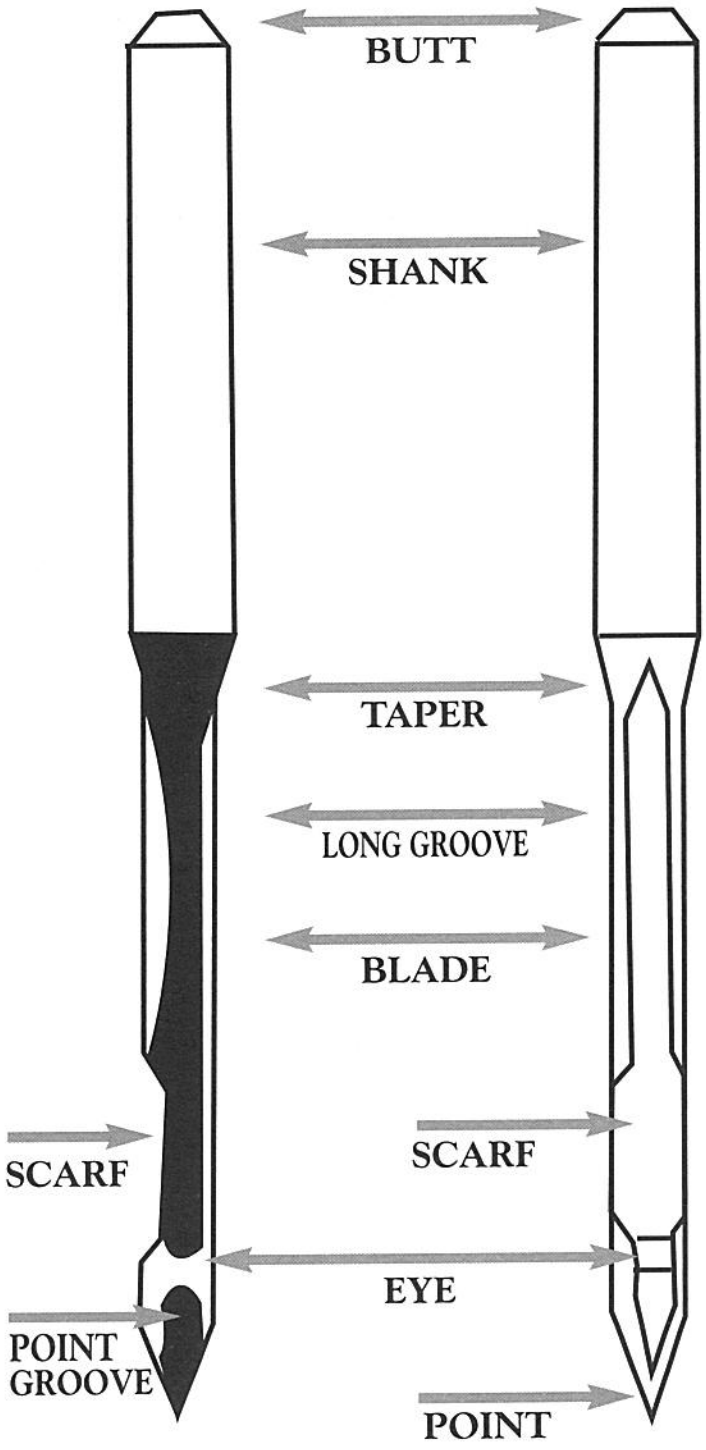
Titanium Gold PD or BPD – These needles are coated with titanium and are much stronger than standard embroidery needles. They will last about five times as long as non-coated needles. These needles can be used on heavy golf bags or duffel bags. Be careful to make sure your machine is running properly if you are going to use these needles. Because titanium is stronger than the rotary hook on your machine, if the needle hits the hook, it could cause the hook to break.

Teflon (Cool Sew) – Teflon coated needles can be used to reduce friction between thread and the needle. Synthetic materials usually stick to the needle surface. As the synthetic thread passes through the eye of the needle, it creates friction and heat that may melt or snap the needle.

Needle Recommendation Chart

Fabric/Garment	Needle Size	Needle Point
Canvas or Denim	75/11 to 80/12	Sharp
Caps	75/11 to 80/12	Sharp
Coated or Waterproof Fabrics	80/12 (Teflon coated)	Sharp or Light Ballpoint
Corduroy	75/11	Sharp or Light Ballpoint
Dress Shirt (woven)	70/10 to 80/12	Sharp
Fake Fur	75/11	Ballpoint
Golf Shirt (knit)	70/10 to 80/12	Light Ballpoint
Lace	75/11	Sharp
Leather	80/12	Sharp or Wedge point
Lingerie and Silk	60/8 to 70/10	Sharp or Light Ballpoint
Lycra or Spandex	70/10 to 80/12	Medium Ballpoint
Nylon Windbreaker	70/10 to 80/12	Light Ballpoint
Rayon	75/11	Ballpoint
Satin Jackets	75/11 to 80/12	Sharp
Sweater/Sweatshirt	70/10 to 80/12	Ballpoint
Taffeta	65/9	Sharp
Towels	75/11	Sharp or Ballpoint
Velvet	65/9	Sharp
Vinyl	75/11	Sharp or Wedge point

NEEDLE ANATOMY



BUTT: Shank end of the needle

SHANK: Part of the needle that attaches to the machine

TAPER: Transitional area of the needle between the blade and shank

LONG GROOVE: Protects and guides the thread as the needle enters the fabric

BLADE: Working area of the needle; the element that is measured by a micrometer to determine needle size (diameter)

SCARF: Clearance above the eye that creates space for the hook to pick up the thread loop

EYE: Open space in needle through which thread is placed

POINT GROOVE: Minor indentation that directs the thread to lie at a 90-degree angle from the eye (May be barely distinguishable on small needles)

POINT: Area below the eye that enters the fabric first, leaving a specific hole shape

Point Types

by Ken Parsons

There are two basic types of needle points used by embroiderers—commonly referred to as *sharps* and *ball-points*. Sharps are also sometimes called round or normal points.

The general rule is that you use sharps for woven fabrics and ball points for knitted fabrics. This is because ball points push the yarn aside, rather than piercing it, damaging the interlocking structure of the knit.

Incorrect point selection can result in symptoms like needle cutting of the fabric, puckering of the embroidery, and lack of crispness in detailed areas. For example, a tightly woven nylon lace Supplex® cannot be as effectively embroidered with a ball-point needle. A sharp point needle will penetrate cleanly rather than bouncing off of the surface, being deflected to a skewed penetration point. Also, a ball point needle can cause tightly-woven fabrics to loosen in the hoop. This is particularly apparent on nylon satin jackets, which often have embroidery with a puckered appearance. This is because the fabric is being loosened a little bit more with each needle penetration. A sharp point is needed for these wovens, with an **acute round** giving even better results. This needle has a narrower point that makes a smaller hole, which slips more easily through the weave. This needle choice is also appropriate for delicate wovens, like silks.

APPLICATIONS FOR NEEDLES

It is always best to buy in bulk because it is the most cost effective. 70/10 and 80/12 are the most often used needles. It is also good to keep other size needles such as 65/9 or a 75/11 in stock for special items such as silk or leather. You should also color code your needles by putting nail polish or permanent marker on the bottom of the shank. This will allow you to know what needles are on your machine by simply looking at the color on the shank.

There are two numbers given when determining the size of a needle. For example I will use the needle size of 70/10.

The number 70 is the European way of sizing needles. This is also the metric measurement. The diameter of the blade is .07mm. This is multiplied by 100 and you get 70. Needle sizes change in increments of five.

The number 10 is the American way of sizing needles. This is the system that was set up by Singer. The system was started by giving an arbitrary number to the needle. The needle sizes go up in increments of one.

With regards to the European and American numbering systems, most needles have both sets of numbers on them.

NEEDLE RECOMMENDATIONS:

FABRIC/GARMENT	NEEDLE	BACKING	TOPPING	COMMENTS
Canvas	80/12 Sharp	Tearaway	No	Hoop tightly to keep canvas from slipping.
Coated or Waterproof Fabric	80/12 Sharp or Light Ball Point Teflon	Cutaway	No	Heavyweight fabrics may not require backing. One option is to put waxed paper between the fabric and the backing.
Corduroy	75/11 Sharp or Ball Point	Cutaway	1 Water Soluble topping	A higher stitch density, as well as topping, may be necessary to prevent stitches from sinking into fabric.
Cotton Sheeting	70/10 to 80/12 Normal Round Point	Tearaway	No	High density or very detailed designs may require more backing.
Denim	75/11 Normal Round Point	Tearaway	No	Use good underlay going opposite the grain of the denim.
Dress Shirt (Woven)	65/9 to 70/10 Ball Point	Tearaway	No	High density or very detailed designs may require more backing.
Fake Fur	75/11 Ball Point	Heavy & Light Cutaway	Water Soluble and Plastic	None
Foil Lame	65/9 Sharp Soluble, Poly-Mesh	Tearaway, Heavy Water	No	None
Golf Shirt (Cotton/Poly Knit)	65/9 to 75/11	1 heavy Cutaway (some use 2 Cutaway)	Optional	Topping is often used for high detail designs and for pique knits. Water soluble topping is suggested on small lettering.
Golf Shirt (100% Cotton)	65/9 to 75/11 Light Ball Point	1 heavy Cutaway (some use 2 Cutaway)	Optional	Topping is often used for high detail designs and for pique knits. Water soluble topping is suggested on small lettering.
Hats	75/11 to 80/12 Sharp	No	No	Most hats have backing fused into them. If not, use 2 tearaway.
Lace	75/11 Sharp	Heavy, Water Soluble Poly-Mesh	No	None
Leather	70/10 to 80/12 Wedge Point or Diamond Point	Cutaway with spray glue on back	No	Reduce sewing speed. Use the smallest needle possible for the weight of the leather to avoid formation of large holes that could cause embroidery to tear out of garment.
Lingerie and Silk	60/8 to 75/11 Normal Round Point	Poly-Mesh	No	Decrease machine speed, and decrease the needle size to 60/8 for very fine fabric.
Lycra and Spandex	70/10 to 80/12 Medium Ball Point	Tearaway	No	Use a round hoop, and hoop so that the material feels comfortable. Some say embroidery on stretch fabric will pucker no matter what you do.
Nylon Windbreaker	65/9 to 75/11 Sharp	Tearaway	No	Use wooden hoops when possible to keep the fabric from slipping.
Organza	65/9 Ball Point	Heavy, Water Soluble	No	None
Rayon	75/11 Ball Point	Light Cutaway, Tearaway	No	None
Satin Jackets	65/9 to 75/11 New Sharp	Light Cutaway, Tearaway	No	Use woden hoops when possible to keep fabric from slipping.
Sweater Knits	65/9 to 75/11 Ball Point	1 Heavy Cutaway	1 Water Soluble	Tightly woven knits may need just one layer of backing. Wide wale bulky knits may require more topping.
Sweatshirt	65/9 to 75/11 Light Ball Point	1 Heavy Cutaway (some use 2)	Optional	Do not stretch sweatshirt because you risk distorting the design.
Taffeta	65/9 Ball Point	Light Cutaway, Tearaway	No	None
Terry Cloth Towels	75/11 Ball Point	Light Cutaway, Tearaway	Yes	Underlay
Velvet	65/9 Ball Point	Light Cutaway, Tearaway	Yes	Use a higher density stitch with an underlay stitch.
Vinyl	65/9 to 75/11 Wedge Point	1 Tearaway if it has cloth backing. If not, use heavy Cutaway	No	Hoop marks on vinyl can be a problem, so hoop the backing. Reduce the sewing speed.

Needles

GENERAL OVERVIEW

There are two sides to a needle: a front and a back. To properly insert the needle, first locate the straight side with the "long groove". The long groove is the front of the needle. This should be facing you when it is inserted in the machine. The back of the needle contains the "scarf". The scarf is the short indentation above the needle eye. Its purpose is to enable the "hook" to be placed closer to the center line of the needle. The purpose of the long straight groove is to guide the needle thread to the eye during the sewing process. This is why the groove runs almost the entire length of the needle. The width of the log groove is 40% of the width of the needle. This limits the maximum diameter of the sewing thread that can be used.

There are several variables to consider when selecting a needle. Application, current size in use, needle eye size and thread type are all factors. Specific needle characteristics are as follows: needle size, needle points and system number.

NEEDLE SIZE

Needle Size denotes the diameter of the blade or shaft; the size you use depends mostly on the thread size. Thicker threads require a larger needle so that the thread can pass easily through the eye. To test the proper needle/thread combination, thread a loose needle with about 2 feet of thread. Alternately raise and lower each end of the thread, letting the needle slide back and forth. If the needle slides easily by its own weight, it is suitable for that thread size.

There are two systems reflecting the measurement of needle size: (1) metric (European) system; and (2) Singer (United States) system. The metric system size is determined by multiplying the diameter of the blade by 100. For example, a needle with a metric system size of 80 has a blade diameter of 0.8 mm (0.8x100). The United States system arbitrarily applies a number to these measurements. A metric system size increases the increments of five; the United States system increases the increments of one. Usually, both systems are reflected on the box (70/10, 75/11, 80/12, etc.)

NEEDLE POINTS

Needle points can either be (A) **ROUND** or (B) **WEDGE** shaped.

(A) ROUND POINT NEEDLES are either sharp (most popular variety, used on tightly woven garments like towels or denim) or ball point, (which is available in different size points: light ball point, medium ball point, etc.). Ball point needles are used on knit goods, delicate fabrics and fleeces where a sharp point might cut fabric fibers. A ball point needle moves the fabric fibers aside without cutting them.

(B) WEDGE POINT NEEDLES are used primarily on leather or tough, non-woven fabrics. They cut as they penetrate, and their shape reduces friction while piercing the leather.

THE SYSTEM NUMBER

THE SYSTEM NUMBER is an additional descriptive term for needles. These are numbers referring to the total length of the needle and variations in the needle eye. Changing to a new system may require a change in the timing of your machine, if the length of the new needle is different than what you are presently sewing with.

Hirsch stocks the following system types:

DBxK5: This reinforced needle is highly recommended by Brother for use on their embroidery machines and is standard equipment on new Tajima and Brother machines. It has a needle eye one size larger than system 16x257, but its shaft length is shorter. Therefore, changing from 16x257 to DB x K5 would require machine retiming.

DBx7ST: Similar to the DBxK5, but with an elongated rectangular eye specifically designed for use with metallic thread.

DBx9ST: This needle system is designed for use with heavy embroidery threads and has an eye twice as large as basic needle systems such as 16x257. We recommend the use of this thread with our Aurilux synthetic thread.

All the above systems are interchangeable.

16x257: This needle is offered by Schmetz for high speed embroidery machines. Its shaft is longer than the "DB" systems, and they are not interchangeable without retiming your machine. This system is commonly found on Melco embroidery machines.

287 WKH: This needle system offers a large eye, similar to the DB x K5. Its shaft is longer than each of the "DB" systems and the 16 x 257 system, so they are not interchangeable.

15x1: This system is designed for use with smaller sewing machines. This needle will not work on larger embroidery equipment.

COATED NEEDLES

Needles may also be coated with a non-stick substance, to reduce heat buildup and allow the needle eye to remain clear of thread or garment fibers. These needles are referred to as Teflon coated or Cool Sew, depending on the manufacturer. Their ability to reduce friction makes them ideal for synthetics like cordura and nylon.

THREAD BREAKAGE

Thread breaks can be caused by: too high thread tension; using too thick a thread in relation to the size of the needle; a burr in the needle; or too high needle temperature when synthetic threads are used.

RULE OF THUMB

- If a needle is too thick, it breaks the fabric's threads.
- If a needle is too thin, it causes skipped stitches.
- Call **HIRSCH** at **1-800-883-3799** for all your needles and supplies.

NEEDLE RECOMMENDATION CHART

FABRIC/GARMENT	NEEDLE SIZE	NEEDLE POINT
Very lightweight or transparent fabrics (lingerie, silk)	65/0 to 70/10	Sharp point or light ball point
Lightweight woven fabrics (dress shirts)	70/10 to 80/12	Sharp point
Satin, nylon, spandex	70/10 to 80/12	Sharp point or light ballpoint
Medium weight woven (wool)	80/12 to 90/14	Sharp point
Knit Fabrics (fleece)	70/10 to 80/12	Light ball point/Medium ballpoint
Elastic fabrics (lycra)	70/10 to 80/12	Light ballpoint or medium ballpoint
Heavyweight fabrics (canvas, denim)	80/12 to 90/14	Sharp point
Coated or waterproofed fabrics	80/12 to Teflon	Sharp point or light ballpoint
Leather	80/12 to 90/14	Wedge point

NEEDLE SIZE COMPARISON CHART

Metric	65	70	75	80	85	90	95	100	105	110	120	125	130	140	150	160	170	180	200
Singer	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23		24	25

Thread

There are several different types of thread that will help to create quality embroidery for different applications.

Types of Threads

Rayon

- Rayon thread has a high sheen, which makes it very attractive for embroidery.
- It is available in many colors.
- Easily breaks by hand for trimming while sewing.
- Washable, dry cleanable and mostly colorfast.

Polyester

- Available in high sheen.
- Much stronger, more durable thread that results in less thread breaks.
- Washable, dry cleanable, very colorfast, less expensive and will withstand bleaching.
- Use for items that will be subjected to excessive sunlight, wear or bleaching.
- Tendency to stretch and loop. May require adjustment of check spring.

Acrylic

- Similar to polyester in appearance and handling.
- Slightly stiffer than rayon.
- Cut the thread at an angle so that you prevent fraying of the different plies of thread.

Cotton

- Low sheen.
- Easily breaks by hand.
- Dry cleanable, colorfast.
- Special care in the cleaning of the embroidery machine is required since cotton thread produces more lint fibers.
- Preferred by many for low luster fabrics such as towels and shirts.

Neon

- High sheen and glowing.
- Available in both rayon and polyester.
- Washable, dry cleanable, and colorfast.
- Use for specialty applications.

Metallic

- Color selection will be limited.
- Dry cleanable.
- It is made with a nylon or rayon core and has the metallic thread wrapped around it.

Helpful Hints for Metallics

Design: Inform your puncher that you will be using metallic thread. Tell him the size and type of thread, fabric and backing to be used. Try to use lettering that is at least _ inch in height.

Machine: Your machine should be in excellent running condition. It is advisable to run the machine at a slower speed than usual.

Needles: Use a "rectangle" eye needle (DBx7ST) at least a size 75/11. Using new needles will assure less possibility of burs to cause fraying.

Fabric and Backing: Try to use soft and pliable fabrics and backings.

Tension: The top tension should be made slightly looser while the bottom tension can remain the same as long as it has been previously adjusted properly. To prevent kinking of the thread, poke a whole in the bottom of a styrofoam cup and place it upside down over the cone of thread.

Thread Weight

Fine or thin thread is measured by a weight of 50. It is best used for small lettering and fine fabrics.
Medium weight thread is defined as 40 weight. This is the standard and can generally be used for the standard design.
Heavy or Coarse thread is measured by a weight of 30. A coarser thread used for a fill stitch will allow you to lower your stitch count.

Bobbin Thread

Continuous-filament Polyester

- The most popular bobbin thread used by embroiders.
- It is strong, thin and consistent
- Produces no slubs or lint.

Cotton

- Allows a wider range of bobbin tensions.
- Not as strong as the continuous-filament.
- Produces a large amount of lint causing build up around tension plate. This will prevent the tension plate from holding the bobbin thread.

Spun Polyester

- Texture of cotton
- Minimal lint problems

Nylon

- Strong and durable
- Will hold more thread on a bobbin than standard bobbin thread.
- Small diameter and slick texture make it difficult to keep a consistent tension.

Thread

GENERAL OVERVIEW

- RAYON: High sheen. Available in more colors. Easily breaks by hand for trimming while sewing. Washable, dry cleanable, mostly colorfast.
- POLYESTER: Available in high sheens. Fewer thread breaks when sewing. Too strong to break by hand. Washable, dry cleanable, very colorfast, less expensive and withstands bleach.
- COTTON: Low sheen. Breaks by hand. Washable, dry cleanable, colorfast. Requires extra care in the cleaning of embroidery machines because of its tendency to produce lint. Many prefer it on towels, shirts and other low luster fabrics.
- NEON: High sheen. (Glowing). Available in rayon or polyester, washable, dry cleanable, colorfast.
- METALLIC: Depending upon brand, color selection may be limited dry cleanable. Sometimes tricky to sew, again depending upon brand. Very attractive look for embroidery.

LUBRICATION

Lubricating your threads may eliminate thread breakage and skipping of stitches caused by the friction of thread rubbing against fabric, or the increased needle temperature from high sewing speeds. Silicone thread lubricant is available in various application methods: i.e. spray can or special containers for machine attachment.

When stocking thread, remember that due to various dying processes, thread is susceptible to the affects of extended air exposure. This problem is referred to as "dye rot". When thread stands for extended periods of time (6-9 months) exposed to air and dust, it weakens, causing increased thread breaks. You should store all your thread in plastic bags or sealed containers to keep it from drying out.

THREAD WEIGHT

Fine or thin thread	.0000	# 50 weight
Medium thread	.000	# 40 weight
Heavy or coarse thread	.00	# 30 weight

CARE OF THE GARMENT

Laundering Rayon Thread: Once an article or garment has been embroidered, it is considered a fine garment and should be treated as such. All embroidered items should be washed with mild laundering agents. Avoid optical bleaching agents of heavy duty detergents and additives such as chlorine, peroxide, or sodium carbonate, which may cause discoloration. IMPORTANT: thoroughly rinse the embroidery, especially articles washed for the first time. During this first rinse, repeat the process until articles are free of residue and water appears clear. Embroidered articles should never be left in a damp or wet pile.

Dry Cleaning/Stain Remover: Rayon may be dry cleaned, but if stain removers come into direct contact with the embroidery, they cannot contain any bleaching agents or color removers. The embroidery must be rinsed after stain remover is used.

Ironing: All embroidered items should be ironed on the reverse side, between two pieces of cloth.

METALLIC THREADS: HELPFUL HINTS

YOUR DESIGN should be punched for metallics. Give your puncher the size and type of thread, fabric and backing. Samples should also be sent. It is not advisable to use letters that are 5 mm or smaller. Any intricate details should be discussed with the puncher, who will punch the design with longer stitches to prevent thread breaks.

YOUR MACHINE should be in excellent condition. It must be timed correctly, and should run at a slow speed.

NEEDLE SIZE: For metallic equivalent to a 40 wt., use an 80/12 needle with a large eye Schmetz 287 wkh PN HAS0041.

FABRIC AND BACKING should be soft and pliable.

TENSION: Top tension should be set slightly looser; bottom tension should stay the same provided it was already set correctly. A sample should be run on the production fabric. Metallic threads tend to kink up. Try poking a hole in the bottom of a styrofoam cup and placing it upside down over the cone of the thread.

APPLICATIONS FOR THREAD

All thread is a natural or ecru color and is dyed. White thread is bleached. Bleaching sometimes makes the thread fragile and weak and may cause thread breaks. Black thread is sometimes dyed twice and this will cause the thread to become weak.

Metallic thread has a rayon core and is wrapped with the metallic color. Metallic thread is thicker than the average thread and is very coarse. The texture of this thread sometimes causes a little more friction than usual and results in thread breaks.

Thread should be kept out of the sunlight to prevent the color from fading and the thread from drying. The best way to store thread is to keep it in a bag. This helps to prevent the thread from drying out.

WHY DOES THREAD BREAK?

By Frank Gawronski
Stitches Magazine – June 1989

One of the most common problems encountered daily in embroidery production is a thread break. Why does thread break and what can be done to minimize these breaks and improve production? The six basic areas involved are: (1) Thread; (2) Needles; (3) Materials; (4) Design; (5) Mechanics; and (6) Operator's Technique.

THREAD:

Wrong Thread Path: This is most common with new operators. The embroidery machines were designed to sew properly with the thread running through the hole and guide in the thread path. Machines not threaded exactly on their paths may sew, but many times will suffer thread breaks or produce bad quality embroidery.

Wrong Thread Thickness for Needle or Density: A #50 cotton or #40 rayon runs well with a size 75 or 80 needle. A #30 rayon requires a size 90 needle and less stitch density.

Knots or Slugs: Occasionally a cone of thread can be found to have knots or slugs. A knot is easily identified by the two short loose ends found in the thread windings. Slugs are lumps or fat sections in the tread. It seems logical that if the thread broke while being wound on a cone, it may have the same problem while being sewn into a garment. If a cone does have several visible knots or slugs, most thread manufacturers will issue a credit or replace the cone. It is possible to have a bad lot of thread, but don't assume that one bad cone spoils the whole box. Examine each cone individually.

Bruised Cone: Some types of cones can be bruised if dropped on the floor. This bruise causes the lower windings to catch as the thread is spooling off, causing a thread break. Watch the cone as it is sewing. If the thread becomes taut at the same place on the cone, look for a bruised edge. One solution is to pull off enough thread to consume this bruised edge and then proceed.

Using Tape to Tie Off Loose Ends of Thread Cones: Tape frequently leaves a residue on other windings of a cone. As this residue passes through the eye of the needle, it causes much friction and thread breaks.

Cone Loosely Spun: Sometimes the threads on a loosely spun cone that has been handled too much or too hard can drop to the skirt of the cone. On cones without flanged bottoms, use a felt washer underneath while running to keep the thread from catching under the cone and causing thread breaks.

NEEDLE:

Wrong Size for Thread: If the needle's eye is too small for thread to pass through smoothly, use a larger needle size.

Burr in the Eye of the Needle: Because thread passes many times through the eye of the needle before planted on the goods, even a slight burr in the eye can wear the thread to a breaking point. At this point you should replace the needle.

Needle Point: Using a sharp point when a light ball point could have sufficed can sometimes cause breaks. A sharp point will rupture the previous stitch, causing the needle to become unthreaded. This appears as a thread break, when in fact it was a shearing of a previous stitch. Look for a right-angle bend at the broken end of the thread. This is a sign of either this phenomenon or a knot trying to pass through the eye of the needle.

Bent Needle Tip: This can happen to either a ball or sharp point needle. The bent tip can tear up the garment or cut the thread as it withdraws from the fabric.

MATERIALS:

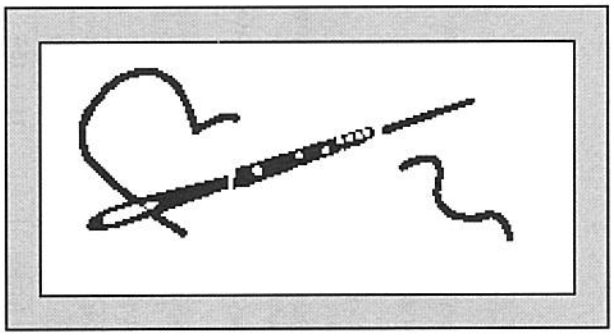
Excessive Friction: Some materials are either so dense or have abrasive or plastic compounds within them that they build up needle heat. This can burn the thread or fuse the plastic compounds to the needle, thus causing thread breaks.

Improper Framing of Goods: Excessive play in hooped goods can cause the needle to deflect too much, and break both the needle and the thread.

Wrong Kind of Spray Adhesives: Screenprinters' adhesive used for holding items to a printing pallet is too tacky for embroidery use. It will cling to the needle and cause thread breaks. Use only spray adhesives designed for embroidery applications. Always spray away from the machine onto the loose goods, catching the overspray on paper or cardboard. Keep spray off the floor and use in well ventilated areas only.

APPLICATIONS FOR THREAD (continued)

WHY DOES THREAD BREAK? (continued)



DESIGN:

Stitch Length Too Short: This is a very common problem with designs that were not punched for production. A design that will run well on a single-head sample machine will not necessarily run well on a multi-head machine. Punchers have to be production-conscious and punch with the operator in mind. All good punchers keep the thread flowing and minimize short stitch lengths. Try to maintain minimum walk stitches at 20 to 25 points and columns at 10 points.

Stitch Densities Too Tight: A puncher should communicate with the production operator to determine proper densities for thread size, type of material and needle point being used. The puncher should also use more uniform underlay, rather than increase density.

Stitching Over Stitching: When stitching has to be placed over other stitching, use an underlay with less density in its base coat to reduce abrasion on top coats of thread. Try to avoid more than two layers of thread whenever possible.

MECHANICAL:

Wrong Needle Depth: This usually manifests itself in the form of thread splitting where one ply continues to sew and the other ply peels back. The thread eventually breaks, leaving previous stitches thinned out. Hitting a hoop or frame is a common way to throw off needle depth.

Wrong Timing: This shows up in many ways, from broken needles and no stitching to poor quality stitching and occasional thread breaks.

Trimmers Not Working Properly: If the trimming mechanism is not functioning properly you can experience anything from threads not being cut all the way cleanly and close to design tails being cut too short.

Needle Too Close to Hole in Needle Plate: This causes thread to rub against the edge of the hole in the needle plate and eventually break.

Nick or Burr: Usually caused by a needlepoint hitting on one of the following parts: presser foot, edge in needle plate or rotary hook.

Hook Too Close: When the hook timing is set at a distance away from the back of the needle scarf the spacing is also established. If the hook is too close to the needle then the thread can not pass between.

TECHNIQUE:

Tensions: Probably the greatest cause of thread breakage is incorrect thread tension. A bobbin that is too tight or binding when inserted into the machine will cause upper thread breakage. An upper thread that is too loose will leave loops through the fabric. An upper thread that is too tight will cause unnecessary stress on the thread and breaks will result.

Holding The Loose End Of Thread During Start-Up: Whether this thread has been wound too many times around the side holding discs or held in the hand, the needle point bends slightly, causing the needle and/or the thread to break.

EMBROIDERY TIPS FOR STITCHING WITH METALLIC THREAD

1. The most important initial step is to have the design programmed correctly for metallic. It is essential your puncher knows the type and size of metallic thread along the fabric and backing it will be stitched on. It is advisable that those samples be sent to your puncher. Therefore, stitch length and density must be adjusted accordingly.

2. Design limitations for metallic thread should be taken into consideration. Letters that are 1/4" high in height are not advisable, and any intricate design details should be discussed with your puncher before programming.

3. Regardless of machine type, make certain that your equipment is in excellent running condition. Your machine should be timed correctly, thread guides should be free of rough spots, and bobbin cases should be checked and cleaned.

4. Needle size is very important for smooth running production. For metallics equivalent to a 40 weight thread, a 75/11 should be used pending on the eye and style of this size. But an 80/12 can assure you great results as well. Also, when switching to metallic from another thread type, start with a new needle.

5. Tensions are critical due to the fact that metallics are less pliable than rayon. Metallic thread will usually run as well as rayon provided that the top tensions are set slightly looser and bobbin tension has already been set correctly.

6. The softest backing should be used whenever possible. Stiff or hard materials can be too abrasive to the metallic thread.

7. Machine speed may need to be adjusted. A slower speed can facilitate the production of many difficult designs.

INSTRUCTIONS ON UPPER/UNDER THREAD TENSION GAUGE

This manual describes the procedure used for zero position adjustment which is necessary when using the gauge for the first time, and also the procedure for measuring the thread tension.

Before using the gauge, please read this manual carefully so that you fully understand the functions of the gauge and the procedure to be followed for your intended operation.

1. ZERO POSITION ADJUSTMENT

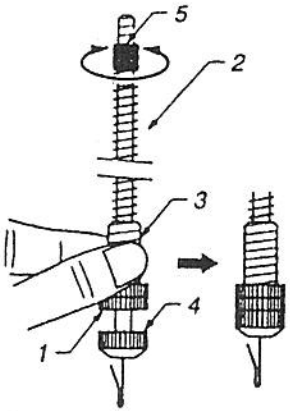
Follow the procedure indicated below.

(1) Take out the spring unit [2] from the case by turning the knob [1] and set it upright by holding the threaded part [3].

(2) Turn the indicator nut [5] clockwise so that the stopper [4] comes into light contact[NOTE] with the knob [1].

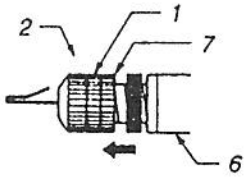
NOTE: If the stopper [4] is already in contact with the knob [1], turn the indicator nut [5] counterclockwise to move the stopper away from the knob [1] once. After that bring the stopper [4] into light contact with the knob [1] by turning the nut [5].

SUPPLEMENT: When turning the indicator nut [5], hold the stopper [4] with the finger.

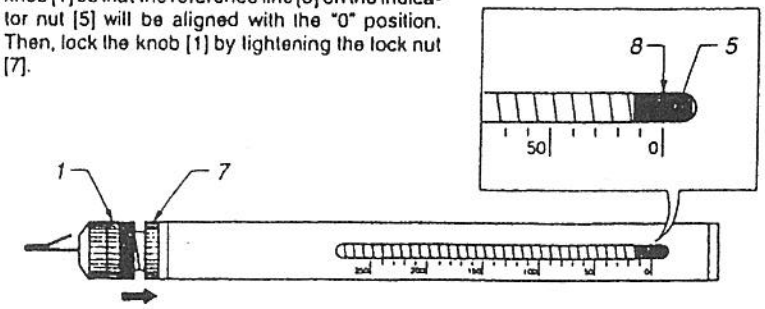


(3) Install the spring unit [2] into the case [6].

SUPPLEMENT: If there is a gap between the lock nut [7] and the knob [1], eliminate the gap by turning the lock nut [7] before installing the spring unit [2] into the case [6].



(4) Adjust the indicator nut [5] position by turning the knob [1] so that the reference line [8] on the indicator nut [5] will be aligned with the "0" position. Then, lock the knob [1] by tightening the lock nut [7].

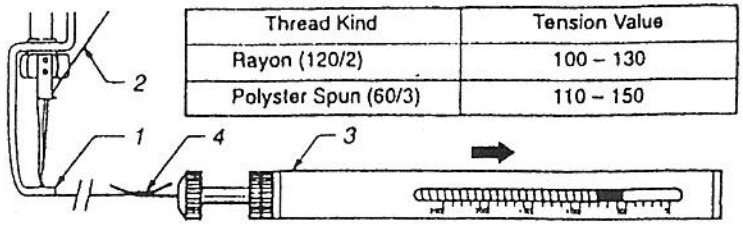


2. MEASURING THE UPPER THREAD TENSION

(1) Wind the front end of upper thread [2] which has been threaded to the presser [1] around the hook [4] of the gauge [3] about by two turns.

(2) Read the indication (tension) of the gauge [3] while pulling it horizontally at a rate of 2 – 3 cm/sec.

SUPPLEMENT: Tension values of typical kinds of threads are indicated below for your reference. Please note that the values will vary depending on the embroidery conditions.

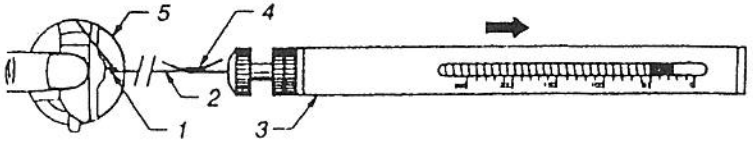


Thread Kind	Tension Value
Rayon (120/2)	100 – 130
Polyster Spun (60/3)	110 – 150

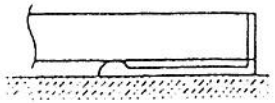
3. MEASURING THE UNDER THREAD TENSION

(1) Wind the front end of the under thread [2] which has been pulled out of the thread guide [1] around the hook [4] of the gauge [3] about by two turns.

(2) Place the bobbin case [5] on a flat place such as a table and hold it in place with a finger. Read the indication (tension) of the gauge [3] while pulling it slowly in the direction shown in the illustration below at a rate of 2 – 3 cm/sec.



SUPPLEMENT: Tension value of typical kind of thread is indicated below for your reference. Please note that the value will vary depending on the embroidery conditions.



Thread Kind	Tension Value
Cotton thread (80/2)	20 – 35

Method For Adjusting Upper Thread Tension

Threading the Upper Thread

Thread the upper thread by referring to Fig, 4-1. Wind it one and a half turns around the rotary tension disk.

Method For Adjusting Upper Thread Tension

Using the adjacent screw (2) and the No. 2 tension (3), adjust so that the upper thread (1) can be pulled out by hand with very little force (see Fig. 4-1). (After adjustment, the force required should be between 100 g and 120 g[NOTE 1].)

Now adjust the No. 1 tension (4) so that it lightly restrains the upper thread and prevents twisting of the thread.

NOTE 1: The thread tension may have to be readjusted when a different thread or fabric is used.

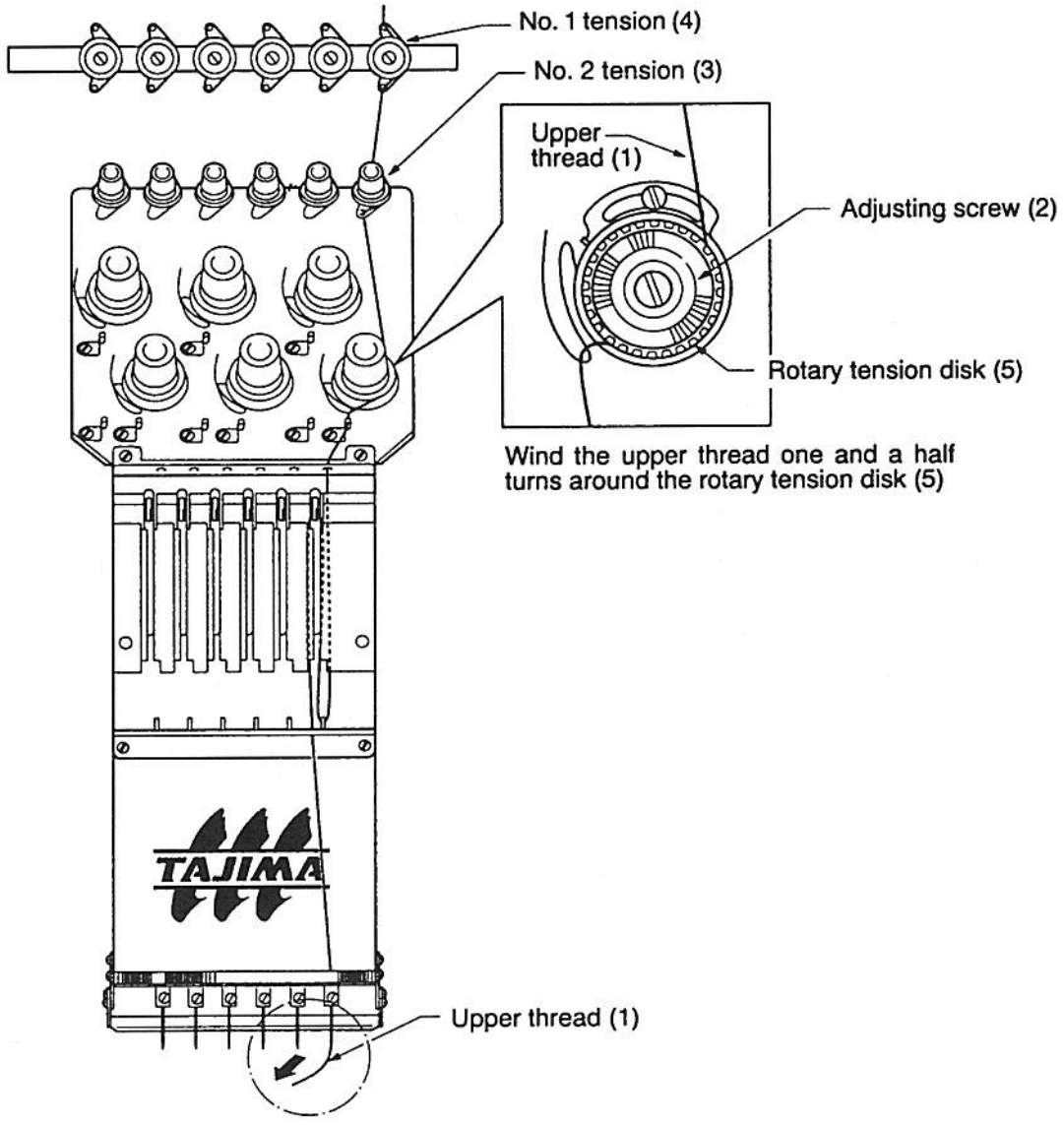


Fig. 4-1

Setting the Under Thread and Thread Tension

1. Set the bobbin (2), on which thread has been correctly wound, into the bobbin case (1).
2. Pass the under thread (5) through the slit (3) and draw it out through the thread guide (4). Pull the thread to make sure that the bobbin rotates in the direction indicated in Fig. 2-3.
3. Adjust the under thread tension with the screw on the tension spring (6).
4. Draw the under thread out approximately 50mm from the bobbin case before setting it in the rotary hook.

NOTE: *Appropriate thread tension*

Hold the thread and joggle the bobbin up and down slightly. The thread should be unwound and drawn out of the bobbin under its own weight. When joggling the bobbin, the thread should be pulled with a force of about 20 to 30g.

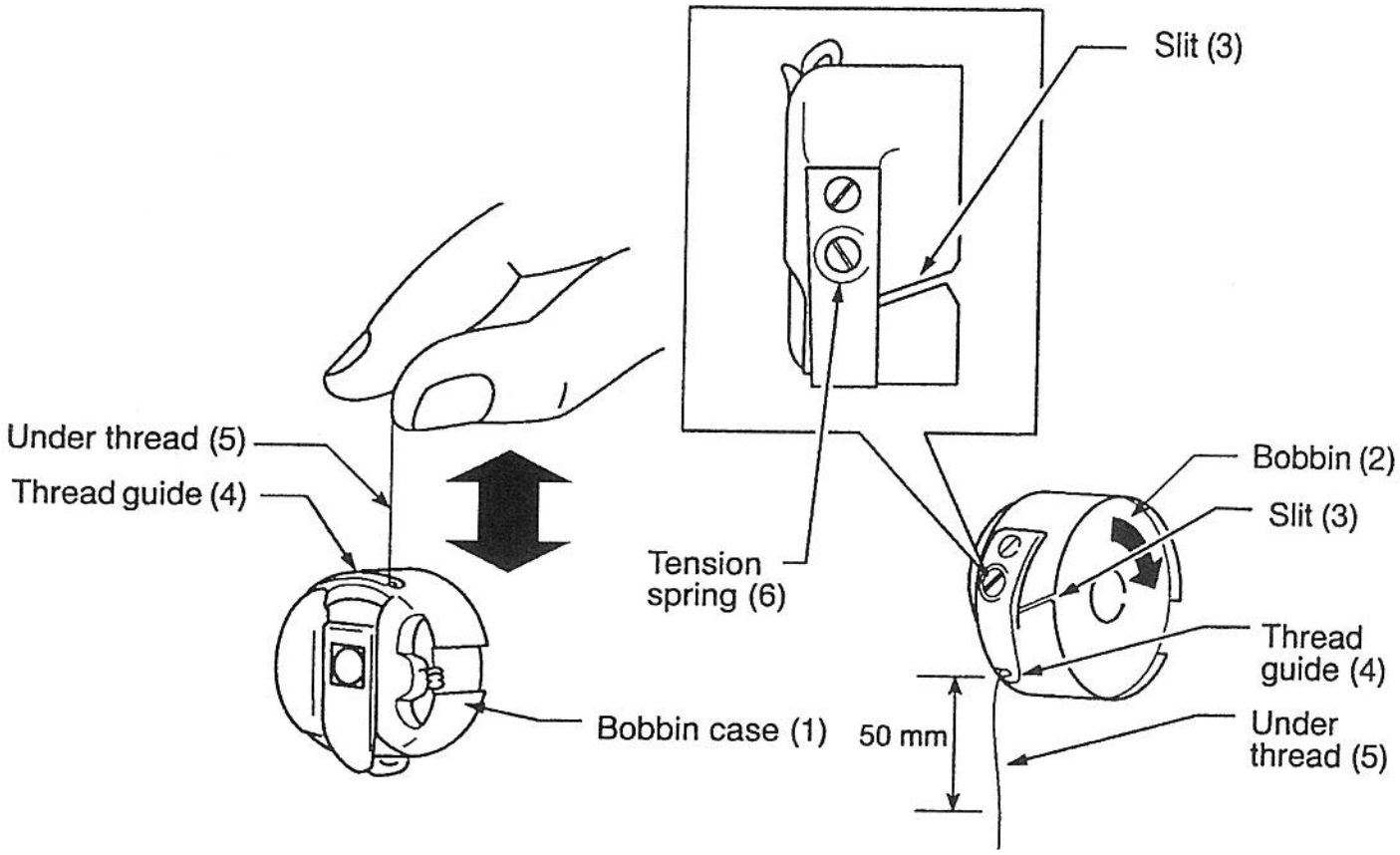


Fig. 2-3

Hoops & Hooping

One of the benefits to machine embroidery is that you can produce identical duplicates of designs. This is done by creating a design on the computer, then embroidering it on garments. By placing the garment in a hoop, the fabric stays in place and the hoop moves as controlled by the machine. Hooping the garment properly is an essential element of quality embroidery.

Selecting the Appropriate Hoop

- **Select the smallest hoop possible** – Using the smallest possible hoop size that will fit your design helps to ensure an even tension on the garment to be sewn. This will lead to good design registration. Make sure to leave at least a half-inch on all sides of the design for the presser foot.
- **Select the appropriate shape** – Try to use a round or oval hoop whenever possible. It will provide the most even tension on the garment.
- **Select a hoop made of the appropriate material** – Hoops are made mainly out of plastic and wood. There are also some cap frames and specialty hoops made from metal. There are special hoops made out of wood which are called Double-Height hoops, they are used mainly to hold heavy or slippery fabrics.

Types of Hoops

- **Tubular** – These hoops are used when the machine table is dropped. These hoops snap into a tubular sash and allow the garment to flow freely. This makes it much easier to sew finished garments.
- **Flat** – These hoops are used with the tabletop up on the machine. There are special framing systems that allow you to load and unload these hoops very easily. They are usually used for pieces of fabric or unfinished garments.
- **Cap Frames** – Cap frames are used to sew constructed caps. They are curved metal hoops that hold the cap in place.

Care of Hoops

- **Make sure to hang hoops when they are not in use** – If they are left in a drawer they can become warped or chipped.
- **Make sure to insert hoops into the machine by holding the metal bar or brackets** – Do not push the hoop into the machine by the wood or plastic.
- **Mark both pieces of the hoop** – This way you can always keep the top and bottom pieces together.

Guidelines for Hooping a Garment

- **Make sure the backing is large enough to fill the entire hoop** – By hooping the entire piece of backing you will help to maintain an even tension for the garment.
- **Smooth out the garment and backing before placing the hoop** – Make sure there are no folds or wrinkles in the garment once it is hooped.
- **Stretch the garment to how it will be worn before hooping it** – If the garment stretches when it is worn, it will make the fabric around the embroidery look puckered.
- **Adjust the hoop before hooping the garment** – Do not tighten the screw after you have hooped the garment or it may cause hoop burn on the garment or cause the design to sew out of registration.

Marking the Garment

- **You can mark the garment with tailor's chalk, masking tape, straight pins or marking pens** – This will show you where the center of the design should start. If you are sewing many of the same garment you may be able to mark the first one, then use the hoop itself as a guideline for the remainder of the items to be embroidered.

Common Placement Guidelines

- **Left Chest** – Center straight down from the shoulder seam 6 – 8" (over 4 – 5" from the placket).
- **Center Chest** – The top of the design should be 3 – 4" from the bottom edge of the ribbing.
- **Jacket Back** – The center of the design should be about 6 to 9 " down from the collar.
- **Turtle Necks** – Should be on the left neck area centered between the center front and left shoulder seam. The bottom of the design should be _" to _" from the bottom edge.
- **Shirt Cuffs** – Top center of the wrist, start 1" to 1 3/8" from the center of the cuff toward the buttonhole and _" to _" above the cuff edge.
- **Shirt Pockets** – Center between the seams of the pocket _" to _" down from the edge.
- **Towels**
  Bath Sheet – Place 3" above border.
  Bath Towel – Place 2" above border.
  Hand Towel – Place 1 _" above border.
  Wash Cloth – Place 1" above border.

Appliques

Why use applique?

- Applique adds depth, color interest, texture and flexibility to a design
- You can reduce your stitch count by using appliques in place of large fill areas.
- You will also reduce sewing time for a design by using appliques.

Basic Cutting Techniques

Hand Cut - Use for less then 10 pieces or if you wish to experiment with the technique.

Template Method

- Have your design digitized as an applique.
- Remove the thread from the needle you will be using to sew out the applique outline.
- Hoop a manila folder and sew out the applique placement line on the folder.
- When you tear the perforated shape you will have a template to use for the applique material.
- Place the template on the material and cut along edges to fit. Place it face down against the wrong side of the fabric to ensure the applique is right side up upon completion of the cut.
- Replace thread, hoop garment and run the outline stitch again.
- Place fabric according to guideline. Temporary spray adhesive may be used to keep fabric in place. Remember to spray away from the machine.
- Resume sewing the tack down and then the decorative zig zag or column stitch to finish off the edge.

Cut Away Method

- Hoop garment and load hoop into the machine.
- Cut a piece of applique fabric larger than the actual applique.
- Place fabric on garment and sew guideline.
- The program should stop at the top so that the sewing head will be clear of the guideline. Trim the excess fabric cutting as close to the edge as possible without cutting the guideline stitch.
- Continue sewing the pattern that will tack down the applique and sew a decorative zig zag or column stitch.

Production Method

- Hoop the applique fabric
- Start the program, which will stitch a running stitch outline of the applique directly on the fabric.
- Unhoop the fabric. Cut along the stitched outline.
- Hoop the garment and stitch the applique guideline on the garment.
- Place the applique fabric on the garment using the guideline.
- Continue the program to sew out tack down and then the decorative zig zag or column stitch to finish.

Die Cut - When doing applique in large volume you should use some form of die cutting. There are several methods.

Traditional Die Cut

- In the process a steel die is made in the shape of the applique similar to a cookie cutter.
- This die is placed on many layers of applique fabric and then into a machine called a clicker.
- The clicker uses hundreds of pounds of pressure to cut through the layers of fabric thus creating numerous applique pieces.

Laser and Water Jet Cutting

- Replacing other methods of cutting applique fabric.
- More exact and consistent.
- It is cost effective when producing in mass quantities as small as 10.

Here are some guidelines as to what to check if you are getting poor sewing quality from your machine.

Troubleshooting

Thread Breaks

- Check the thread path from the cone to the needle. It may not be threaded properly.
- Check the cone of thread. If the thread is not wound properly, it may cause thread breaks. Try using a new cone of thread.
- Check the tensions on the top thread and the bobbin thread. If the top tension is too loose or the bobbin tension is too tight, it may cause the thread to "birdnest" on the underside of the embroidery.
- Try using a larger needle. If the eye of the needle is too small for the thread to flow through freely, it will cause thread breaks.
- Make sure there are no burrs on the needle eye, thread guides, throat plate or rotary hook. If the thread gets caught on any of these, it could cause the thread to break.
- Clean the lint from the thread path. You can use a brush or an air blower to clean these areas.
- Make sure there are not too many small stitches in one area of the design or the design is not stitching over the same spot numerous times in a row. Try to decrease the density in the area that is having thread breaks.
- Slow down the machine. If the machine is sewing too fast, it may cause excess stress on the thread and cause it to break.

Puckering

- Loosen tension.
- Reduce density in design.
- Adjust hooping. Make sure the garment is not too loose or too tight in the hoop.
- Use a sturdier backing or more backing. If the garment is still not stable with a heavier backing, try using a spray adhesive to adhere the backing to the garment or try an iron-on backing.

Looping or Loose Stitching

- Adjust top thread tension.
- Adjust bobbin thread tension.
- Lower the needle depth to ensure the thread is catching properly.
- Check hook timing on the machine.

Poor Registration

- Re-hoop the garment making sure it is tight in the hoop.
- Try using a heavier backing or adding more backing. You may also try using spray adhesive.
- Design may need to have Pull Compensation or Underlay added to accommodate for stretchy or nappy fabrics.
- May be a problem with the heads on the embroidery machine. You should consult with a technician about this.

Stitches are not forming

- Check bobbin thread; make sure it is not empty.
- Check hook timing. The hook may not be catching the thread loop.
- Make sure the needle is inserted correctly.

Needle Breaks

- The needle may be dull and may need to be changed. If the needle can not get through the fabric easily, it may cause the needle to break.
- Make sure the needle is inserted properly. If it is not inserted all the way into to the needle bar shaft, it could come loose while sewing and break.
- Make sure the hook timing is correct. If the machine is not timed properly, the needle may hit the hook, which would cause it to break.

Needle Holes or Cuts in the Fabric

- Try changing the needle. If the needle is dull, it may have a difficult time getting through the fabric and may make a hole in the garment.
- Make sure you are using the appropriate needle point. Sometimes using a sharp needle may cause the fabric to tear.
- Try a smaller needle. Large needles may stretch the fibers excessively and cause a tear in the fabric.
- Try putting a topping on top of a delicate fabric.

Tips For Better Productivity

Backing and Toppings

1. Tearaway backing is usually used for garments that do not require more stability. The fabric itself is stable such as a woven fabric like denim. It can also be used when tearing will not distort or harm the edge of the embroidery.

2. If you find that the water-soluble topping is not doing the trick to keep your stitches aloft, try using something heavier. For example using several layers of tearaway backing or even a light file folder may help you achieve the lift needed to get over those heavy seams and bulky fabrics. After the machine sews the underlay stitch, stop the machine and tear the backing away from the design. Now complete the stitching and your embroidery will rise to new heights.

3. Cutaway Backing should be used for fabrics where more stability is needed such as knits. It will prevent the embroidery from pulling or sagging.

4. A great way to cut your own backing would be to buy a guillotine style paper cutter. It will cut straighter than a scissors, which will help eliminate waste. Scrim felt used for chenille can also use this method.

5. To back fabrics with a more transparent backing use silk organza or even nylon netting. They add stability without the added weight.

6. Washaway/tearaway backing can also be used for translucent white goods. The backing will disintegrate in the wash water and what remains stays under the stitches. This provides a quality look to your embroidery with an invisible backing.

7. To store your water soluble topping you can use a paper towel holder and place it on the wall for easy access.

Threads and Needles

1. A great way to insert a needle with as little difficulty as possible is to use a tooth pick point, old needle or even a pencil point inserted into the eye of needle. You can now turn the needle either left or right as needed to align properly. Make sure the scarf is in the back and the needle is straight ahead or just slightly to the right. The needle should be as far up as it could go into the needle holder.

2. Any garment that will be bleached repeatedly should use a polyester thread for durability. Polyester will not bleach out as other threads do.

3. Pegboards are a great way to organize your threads. You can easily change the configuration of the board as needed. You can also hang other items such as your scissors and bobbins so everything can be in a centralized location.

4. Using 30wt thread (instead of 40) for a large fill will cut your stitch count and even eliminate the use of a topping.
5. A unique look to embroidered items is the use of metallic and neon threads. Always have a selection on hand for your customers to view.

6. Enclose laundering tags for all your jobs to prevent misuse of rayon threads and polyester threads.

7. Having a hard time keeping track of how much thread you use, when to change a bobbin, how long will a needle last? Use the following guidelines: 5,000 yard cone of thread equals 900,000 stitches, 127 yard bobbin equals 30,000 stitches, one needle will last about two million stitches.

Machine Maintenance

1. Always use sewing machine oil for your machine. There is no substitute.

2. Oil your machine in the morning before they are used, rather than at the end of a production day. Oil will drip off the parts you are intending to lubricate. With the same idea, do not oil a machine on the weekend when the machine will not be in use.

3. Preventative maintenance is the best way to keep your machine in tip-top shape. Clean your machine daily and lubricate as directed.

4. Do not use an air compressor if you do not have a dryer. Avoid moisture from collecting in the sensitive mechanisms of your machine.

5. Cotton swabs are a great tool to clean out hard to get to spots of your machine. Keep a supple handy.

6. Keep high wear supplies such as needles, bobbin cases and hook assemblies on hand for emergency repairs.

7. Use small zip lock plastic bags to store extra machine parts and small tools. This will keep them clean, dry and moisture free.

Miscellaneous Items

1. Bias tape is great to wrap hoops with to prevent slippage of silky materials. It provides a softer grabbing power. Floral tape is also used for this purpose.

2. By keeping hand-sewing needles near your production equipment, you will be able to repair garments quickly when needed as well as add a few stitches to areas that are sparse.

3. Keep a supply of masking tape in your production area. This is a great way to hold and mark garments without permanent damage.

4. Soap slivers can also be used to mark fabrics for sewing positions. Just by using a damp sponge you can remove the mark.

5. Magnetic tape with a peel-away sticky backing is a great way to hold something to the side of the

machine or wall. Velcro strips can also be used this purpose.

6. White cards or sheets of paper should be near the machine to use in threading a needle. It will provide better visibility.

7. To mark jacket backs use a yardstick held in place by springloaded wooden clothespins.

8. You can also use clothespins to hold the jacket sleeves away from the jacket when sewing.

9. Keep a camera handy to visually record the designs you create and sew out. Insert into an album and use as a sales tool.

10. Instead of letting one head run empty sew a display sample or even a good will sample for your customers. Again a great sales tool.

11. If you spray fabric sizing on dark fabric hoop burns and rub it with your finger, the burn will disappear.

12. Make an "oil bib" for the needlebar of your multihead machine to catch excess oil before it drips on the garment. You can use a double thickness felt, cut it in an oblong shape longer than your needlebar is wide. Attach each end with elastic, pull it up and tie it above the sewing head.

Embroidering On: Golf Shirts

Backing
Make sure to use a cutaway backing. Try to use organza or no show backing on light colored knit shirts. You may also want to slide a piece of tearaway backing between the back of the hoop and the needle plate to help keep small lettering and detail crisp.

Topping
Always use water-soluble topping on pique knits. You may also want to use water-soluble topping on interlock knits especially if you are sewing small lettering or detail.

Needle
Make sure to use a ballpoint needle. You can use a needle between a size 70/10 and 80/12.

Thread
Normally you would use rayon thread.

Placement
Left chest - Center straight down from the shoulder seam 6 – 8" (over 4 – 5" from the placket).

Hoop
Use a #12 or #15 tubular hoop

Embroidering On:
Satin or Wool Jackets

Backing
Make sure to use a cutaway backing. You may also want to slide a piece of tearaway backing between the back of the hoop and the needle plate to help keep small lettering and detail crisp.

Topping
You may want to use tearaway as a topping for large fill areas. If you are sewing a white fill on top of a dark jacket, place a piece of white tearaway under the fill stitches, tear this away before the border stitch sews.

Needle
Make sure to use a sharp needle. You can use a needle between a size 70/10 and 80/12.

Thread
Normally you would use rayon thread.

Placement
Left chest - Center straight down from the shoulder seam 6 – 8" (over 3 _" to 4" from the snaps).
Jacket Back – The center of the design should be about 6 to 9 " down from the collar.

Hoop
Use a wooden hoop or a tubular hoop. Wrap the edges of the hoop with a tacky tape to help secure the jacket in place. When sewing on wool jackets you should always use a wooden hoop.

Tips
Increase density by about 10 spi when sewing on wool jackets.

Embroidering On: Hats

Backing
Use a heavy tearaway backing on finished caps. Use foam cap backing for unconstructed caps.

Topping
You do not need to use a topping on most hats..

Needle
Make sure to use a sharp needle. You should normally use a size 80/12 or larger.

Thread
Normally you would use rayon thread.

Placement
Front: Center design on front of cap. If the cap has a seam down the center make sure the design is visually centered on the seam.
Sides: If possible, center on the side seam.
Back: Place about _" above the opening on the back of the cap. You should use a 3" arc when placing lettering above the opening.

Hoop
Use a semi-wide or wide cap frame for finished caps. Unconstructed caps can be sewn using a tubular hoop.

Tips
Try to sew a design that was created for caps keeping in mind the curved surface of the cap. If you are going to sew lettering, set it up so it will sew from the center out if possible.

Embroidering On: Towels

Backing
Try to use a cutaway backing or alternately you can use several layers of tearaway backing.

Topping
Always use water-soluble topping on towels. Try to hoop the topping with the towel when possible to ensure it does not move out of place.

Needle
For most towels, you can use a sharp or ballpoint needle. Make sure you use at least a size 75/11.

Thread
Normally you would use rayon thread. You can also use cotton thread on towels because the thread is thicker and it helps to hold down the nap of the towel.

Placement
Bath Sheet – Place 3" above border.
Bath Towel – Place 2" above border.
Hand Towel – Place 1 _" above border.
Wash Cloth – Place 1" above border.

Hoop
Use a tubular or wooden hoop.

Tips
Make sure to add at least 10 spi to the design or lettering.

Embroidering On: Leather

Backing
You do not have to use backing on leather but it is a good idea in case you have to remove the stitches.

Topping
You do not need to use any type of topping with leather.

Needle
You can use a sharp needle size 80/12 or a wedge point needle. Wedge points are made especially for leather and make a smaller hole in the leather..

Thread
Rayon is the most popular thread for most applications. In the case of sewing on leather, polyester is also a good choice because of the strength of the thread. Polyester thread has more tensile strength and will have less thread breaks.

Placement
Depends on the item on which you are sewing.

Hoop
You want to try not to hoop the leather if possible. The best way to do this is to hoop backing and stick the leather to the backing with spray adhesive. If you have to hoop the leather, wrap the hoop with athletic tape to minimize the hoop marks on the leather.

Tips
Decrease you density as much as possible when sewing on leather. Each time the needle penetrates the leather, it is piercing a hole in the leather. If these holes are too close together it will punch out the fabric. Try to decrease the density by at least 10 spi.

Hooping Tidbits

Selecting hoops and learning to use them can be challenging. Use these tips to get a grip on hooping.

You've heard the expression, "It's all in the stitch." Well, hooping plays an equally important role in the embroidery process. In fact, improper hooping can cause a number of problems with stitching. For example, if a knit shirt is trooped too loosely, the design elements may not line up correctly, causing the registration to be off. If trooped too tightly, embroidery on the same shirt would likely pucker, or there may be needle cutting along the stitching edges.

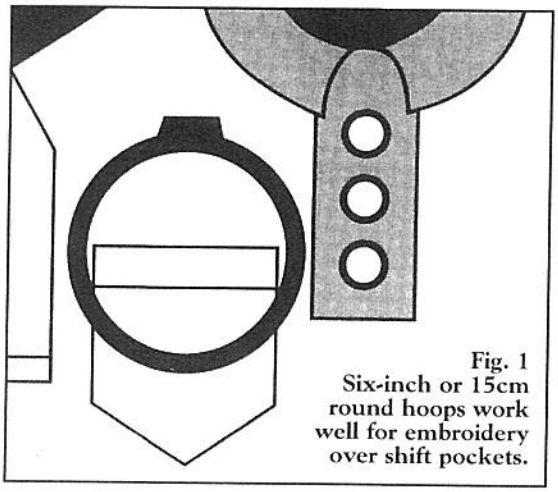


Fig. 1
Six-inch or 15cm round hoops work well for embroidery over shift pockets.

Besides tension, there are a number of other variables that factor into hooping and, ultimately, your embroidery results. Identifying the proper hoop style and size for a specific job, learning tricks for hooping difficult fabrics and finding hooping aids that help make the process easier are all important factors in giving your embroidery the best possible foundation.

Following are a few hooping tips, some 'no-hoop" hooping tips and information about hooping devices designed to make your foray into embroidery successful.

Hooping Tips

Frame Selection:

• Select the smallest frame that will comfortably accommodate the size of the embroidery design. Using the correct hoop size creates an even tension on the area being sewn, which leads to good design registration. You need approximately one inch on each side of the design for the presser foot. In other words, if your design is a four-inch square, four plus two (one inch on each side of the hoop) equals six, and you need a six-inch hoop.

• Choose a hoop size that is a close fit, but not *too* crowded. (The back of the presser foot needs more room to clear the hoop than the front or sides, because it is larger.)

Hoop Shape:

• Round or oval hoops provide the most even tensioning on fabric.

• When round hoops are made of wood, rather than metal or plastic, both parts may need to be marked with alignment marks. This will ensure that this shaped, rather than molded, hoop will match up to its best fit.

Hoop Materials:

• Though plastic has been a popular production hoop for years, wooden hoops are gaining in popularity, especially for larger hoop sizes.

• The most popular wooden hoops are called *double-high* hoops. Their sides are roughly twice as tall as conventional plastic or wooden hoops. These hoops grip slippery or bulky goods better by providing a bite on a larger surface area. (Because jacket backs are a primary item embroidered in large hoops, double-high wooden or plastic hoops are worth their higher price tag.)

• Metal is also used for certain specialty hoops and in most of the hoops in the Meistergram machine accessory line.

Hoop Inventory:

Your machine starter kit will include hoops, which will work fine until you determine your day-to-day order requests. Here are some popular hoop sizes and their recommended uses:

• **Four-inch or 12cm round hoops**. These hoops are used for small shirt or jacket-front embroidery, including personalization, hemmed sleeves, shorts and other common garment applications.

• **Six-inch or 15cm round hoops**. These are often preferred for embroidery over shirt pockets, because they allow the embroiderer to keep the bulky pocket seams inside the hoop. In other words, even when a logo will fit inside a four-inch hoop, the pocket area can be trooped straighter and flatter when the hoop falls outside the pocket corners. (*See Fig. 1.*) These hoops are also used for blazer crests, aprons and jackets.

• **Eight-inch or 19cm round hoops**. These are most commonly used as a base to hold a spider, or distancing insert, for quick-change hooping systems. In this system, the hoop that holds the garment is snapped into (not screwed into) the spider, which holds it securely without additional hardware.

• **12-inch square, round, oval or rectangular hoop**. There is a lot of variance in larger hoop sizes and shapes. Large round hoops are probably the least used, because they are generally used for such unstable goods as knit shirts. Many of the items that routinely require a larger hoop, however, such as jackets, tote bags, and so on, are stable woven goods.

Rectangular, square or oval jacket-back hoops are more common, and many different dimensions are available. Try choosing two sizes to cover your large design needs. You will need one size to accommodate the majority of large designs, say 12 inches by 13 inches. You might also want to select a hoop for oversized designs. There are hoops available as large as 12 inches by 18 inches, but it is hard to apply so large a hoop to some garments. The 1 8-inch dimension usually extends over sleeve seams on small jacket sizes, and better results may be achieved

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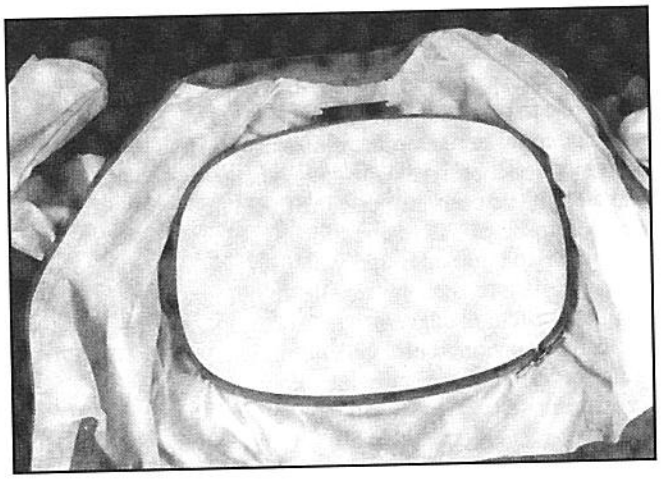
by using a narrower hoop.

• It's a good idea to maintain three sets of four-inch or other small hoops per machine head. The designs or lettering sewn in these hoop sizes often have a low stitch count, which means they run quickly. If all three hoops for each head are loaded early in a production run, you will have a *draw pile* of pre-hooped pieces to speed production along.

• Keep a spare hoop of each size on hand in case a hoop breaks. Hoops aren't that expensive, and it's better to be prepared and avoid downtime. You can repair broken hardware or other hoop components with replacements from your equipment supplier.



The surface ripples on the hooped garment shown at left could have been caused by the hoops being adjusted too tightly, which made the inner hoop push the fabric toward the center.

Techniques:

• There should be a light surface tension to the trooped piece. If the hoop is properly adjusted before it is applied, then the tension is created automatically.

• Tightening the adjusting screw after the inner hoop is applied doesn't help add tension, but it could leave a hoop impression on the goods once the hoop is removed.

• If hoops are adjusted too tightly, surface ripples can appear from the inner hoop. pushing the fabric toward the center of the hoop. But if the hoop is adjusted too loosely, design elements may not line up.

Hooping Soft Goods:

Knits:

• First, determine in which direction the fabric has the most stretch. When hooping, apply a slight tension with your free hand in the direction having the *least stretch*. Done correctly, this won't stress or distort the knit. (Stretching too much results in fiber bursting and possible needle cutting.)

• Overtightening the adjusting screw can result in *hoop burn*, or a hoop mark left around the design after the hoop is removed.

• When the inner ring doesn't slip easily into the outer ring, it is usually forced in. This pushes excess fabric toward the center of the hoop, resulting in surface ripples. Rather than pulling on the edges of the fabric to relieve the wrinkles, try recessing the inner hoop so that it is slightly lower than the outer hoop. This places a gentle amount of tension on the knit, removes the surface wrinkles and places the garment flatter to the machine table.

• The framed piece should rest completely flat against the machine table. Air between the framed goods and the table results in *flagging*, an up and down motion of the fabric. Press on the fabric; if you must push it down to the tabletop, the hoop needs to be placed flatter to the machine table.

• On two-way stretch knits, stress them to the extent that they will be stretched when they are worn during hooping. For example, slightly stretch bike shorts and socks, but not turtlenecks.

Bulky Items:

• Bulky goods may be held best with holding fixtures, not hoops. Magnetic holders and other devices have been created for just such items. Horse blankets and sheepskin-lined jackets are better secured in conventional hoops, however.

• Hooping bulky items is the only time you should consider tightening the hoop *after* it has been applied.

• Loosen the hoop's adjusting screw to accommodate the thickness of the goods. Sometimes the screw isn't long enough to allow the outer hoop to open wide enough, but if you are able to open the screw sufficiently, apply the top of the hoop first, then the bottom. With the adjusting screw at the bottom of the hoop, it is usually possible to press the bottom of the inner ring into place. It may now be necessary to tighten the screw to hold the piece securely throughout the stitching process.

Satin & Nylon:

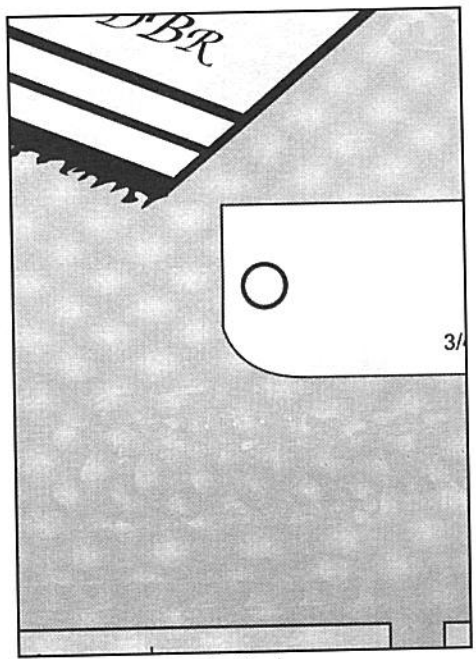
• Because these slippery goods can be hard to hoop, many embroiderers wrap the inner hoop with athletic gauze, which is slightly tacky. The gauze provides a cushioned gap for hard-to-hold goods and is easily removed when finished.

• Try hooping tissue paper right on top of the garment, with the glossy side toward the garment and the matte side toward the hoop. Then, tear out a window where the embroidery will be applied. The hoop grips the tissue, which provides a buffer, preventing the fabric from making direct contact with the hoop. This works great, especially if your wooden hoops have splinters or nicks that could damage delicate fabrics.

No-Hoop Hooping

Puffy, napped goods are often susceptible to hoop impressions that last after stitching is completed. But there are alternative holding methods for such items. Though it may cost more in terms of supplies and materials, these alternative methods are usually just as efficient as conventional hooping.

• *Spray adhesive* really works, but you must spray the adhesive outside of the immediate embroidery area and out of the

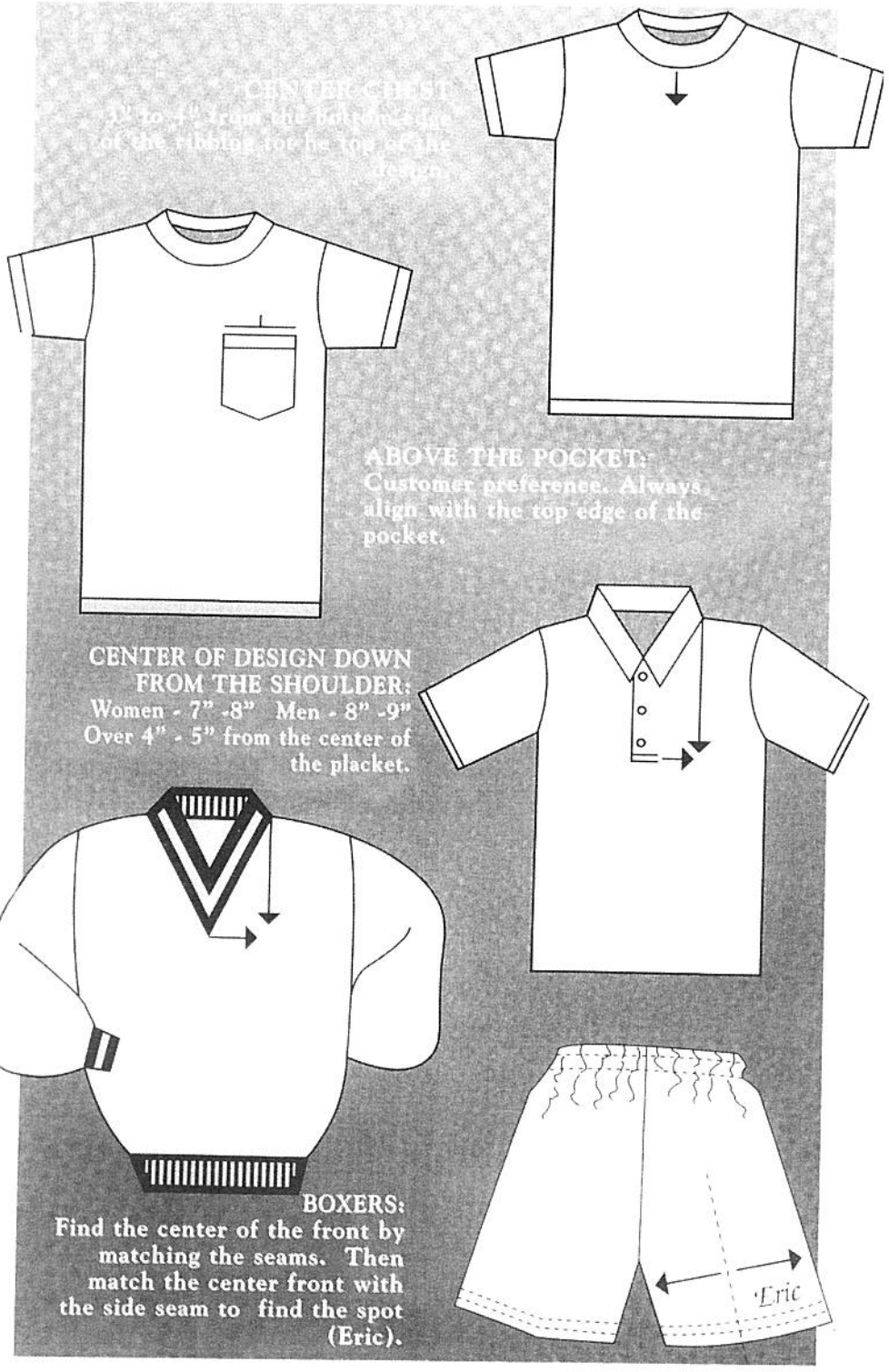


P&F Equipment Co.'s air press uses compressed air for hooping.

PLACING THE HOOP

You have decided on the hoops and/or trooping aids that will work well for your embroidery operation, and you've experimented with getting the tensions just right on sample fabrics and garments. But now it's time to get down to business. Just how do you figure out where to hoop the garment so your left chest design doesn't end up too near the shoulder or too close to the placket?

Dorothy Bushman and Casey Young of The Stitchery in Des Moines, Iowa, have put together a helpful guide called "Hooping, Placement & More..." to aid embroiderers with just this sort of dilemma. You'll find their words of wisdom and sample illustrations here and on the next page.



way of the machine. Hoop a piece of backing in your selected hoop to serve as a carrier for the goods to be embroidered. Spray either the goods or the backing in the targeted area. Press the garment into place onto the backing and embroider away. Spray adhesive works best for small, lightweight items with low stitch counts.

- *Taping* is an excellent holding method for cap and garment panels, but you must use a base carrier. There are a number of carrier materials used by panel embroiderers, including linoleum, lightweight Plexiglas®, Lexan®, upholstery vinyl and pattern plastic, a sturdy material used for making patterns in cut-and-sew operations. The carrier material is first affixed to the pantograph rack or large hoop, and then windows are cut out where the embroidery will be applied.
- *Pressure-sensitive* holding techniques are relatively new. This type of holder consists of backing pre-coated with a pressure sensitive adhesive, then covered with release paper. Depending on the application, the backing can be a traditional non-woven or a vinyl, polyester or nylon film. Hoop a piece of pressure-sensitive backing *paper side up* in your selected hoop size. Try to allow for at least a one-inch border of backing inside the hoop but outside of the intended embroidery area. This helps ensure that you have enough adhesive contacting the goods to hold it securely. Slit the backing paper and remove it to expose the pressure-sensitive material. Apply the goods to be embroidered onto the exposed adhesive. If more support is needed, reinforce the sticky backing by sliding a layer or two of conventional backing between the machine table and the hoop.

After stitching, remove the hoop from the machine and pull off the embroidered item. Cut a patch of pressure-sensitive backing, peel off the release paper and patch the hole from the underside of the trooped backing. Press the next item to be embroidered down over the patch. Repeat the patching process until the outer adhesive will no longer hold the goods securely.

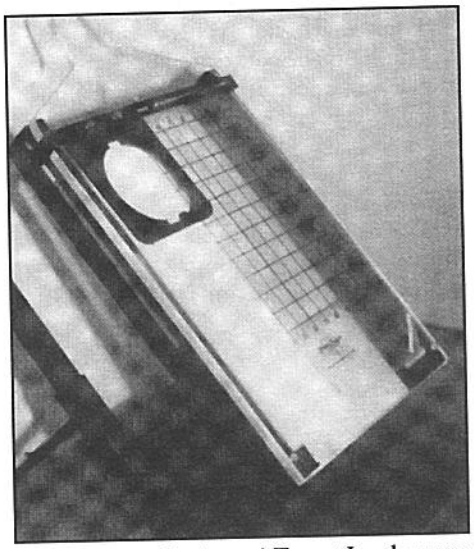
Hooping Devices

Hooping aids help embroiderers in several ways: The hooping technique is more likely to be correct, giving better embroidery results, and hooping time is

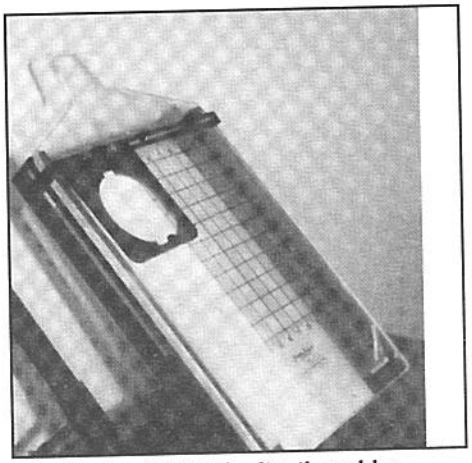
reduced, allowing more time for finishing or otherwise increasing efficiency. Many hooping stations are designed with ergonomics in mind, lessening the odds of troopers developing repetitive motion disorders, such as Carpal Tunnel Syndrome. Accuracy of placement is simpler to achieve, and some models even sport sophisticated gun-sight placement devices. This technology, which is capable of aligning embroidery precisely with screen-printing or other garment elements, exemplifies the broad range of engineering applications in today's embroidery accessories.

The following is a brief summary of hooping aids on the market, listing the distributor, targeting feature, hoop application, station type and price range.

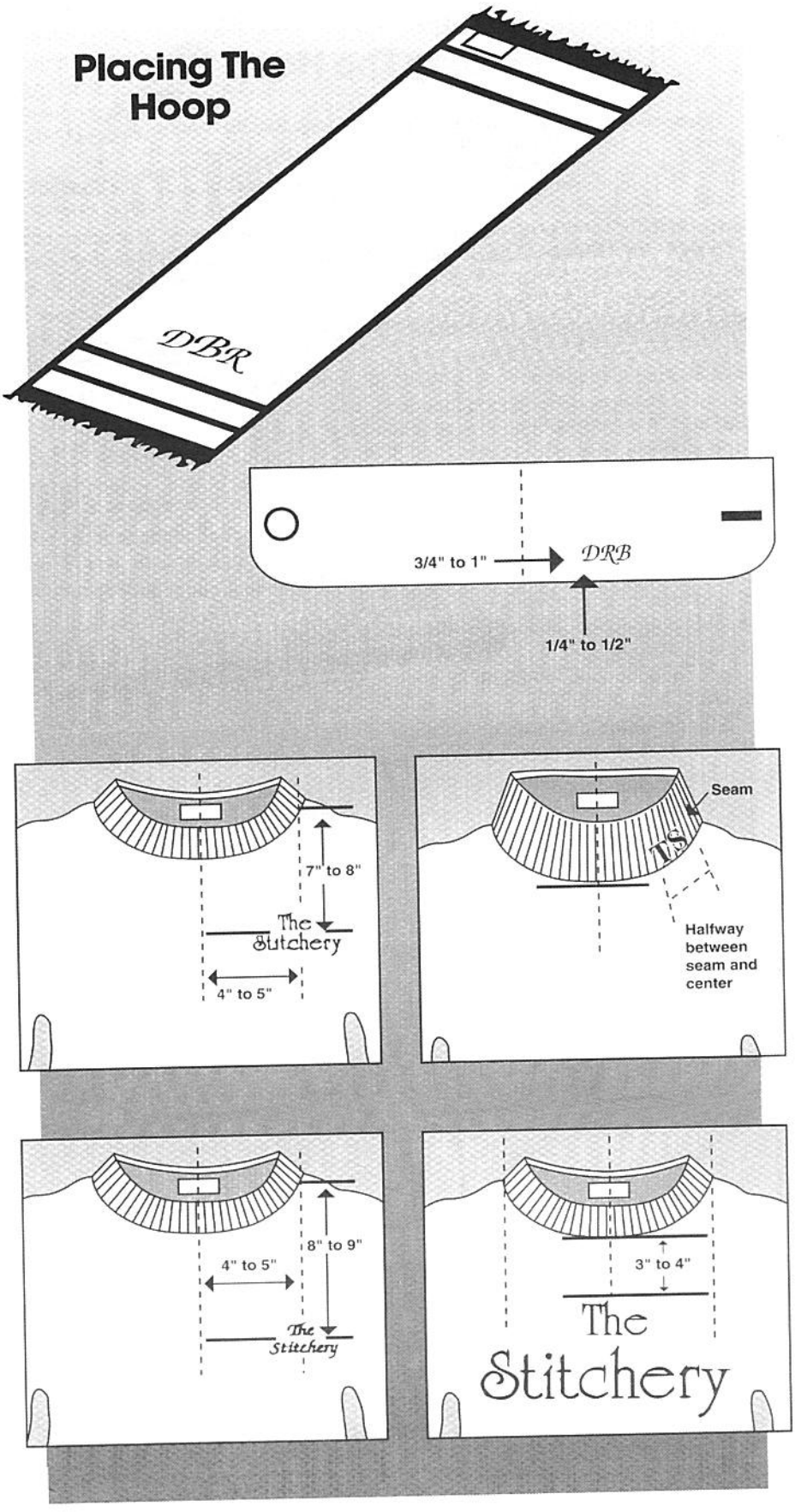
- **Aliner**—Distributed by Crafts By



Mirror Image Engineers' Target Loader uses a clear acrylic grid that is backlit with two fluorescent fixtures.



The Design 'N'Stitch, distributed by DataStitch Inc., features lighted cross-hairs as a placement aid.



Ron in Houston, and Data-Stitch Inc. in Aledo, Texas, this device features a clear acrylic grid panel that is backlit to aid with placement accuracy; there is a laser targeting option. The hoops are applied by hand with a single tabletop station accommodating framing for both garment front and back placements. Price range: up to $2,000.

• **Data-Stitch Hooper**—Distributed by Data-Stitch Inc., Aledo, Texas, this hooping aid uses a main base and recessed overlay boards that attach with Velcro~ fasteners. Metal spring clips hold backing in place while hooping. The hoops are applied by hand on a tabletop station. Price range: up to $900.

• **Design 'N' Stitch**—Distributed by Data-Stitch Inc., Aledo, Texas, this hand-operated press features lighted cross-hairs as a placement aid. It can be used on a tabletop, or it is available with an optional floor stand. Price range: $901-$2,000.

• **E-Z Hoop**—Distributed by E-Z Hoop, Warren, Ohio, this hooping aid can be mounted to a tabletop with suction cups or attached to a floor stand. The device features an acrylic grid targeting platform that can be raised for slipping the garment over; then it is laid flat to apply the hoop. Price range: $901-$2,000.

• **Hoop Aire Hooper**—Distributed by Embroidery Supply Warehouse, Hauppauge, N.Y., this pneumatic press uses laser targeting and is available in a tabletop version. Price range: $2,001 and up.

• **Macpherson Hooping Stand**—Distributed by Macpherson Meistergram Inc., Greensboro, N.C., this hooping stand can be used as a tabletop unit and is hand operated. Price range: $901-$2001.

• **Macpherson Framing Press**—Distributed by Macpherson Meistergram Inc., this foot-operated press has an optional laser targeting device. Price range: $2,001 and up.

• **P&F Framing Press**—Distributed by P&F Equipment Co., Stokesdale. N.C., this foot-operated press is available with several different alignment and targeting systems. Price range: $2.001 and up.

• **P&F Air Press**—Distributed by P&F Equipment Co.. this tabletop hooping aid features a Lexan~ plastic targeting device with grid, using compressed air for hooping. Price range: $2,001 and up.

• **Perfect Hooper**—Distributed by Perfect Hooper, Racine, Wis., and Accessory Resource Corp., Denver, this hand-hooping station features a pivoting tabletop to allow the operator to easily slip garments over the hooping panel for hoop application. Price range: up to $900.

• **Target Loader**—Distributed by Mirror Image Engineers, Woodland Hills, Calif., this tabletop unit uses a clear acrylic grid that is backlit with two fluorescent fixtures. Price range: up to $900.

• **UWI Press**—Distributed by Upholstery West Inc., Midvale, Utah, this foot-operated pneumatic press has a laser targeting system. Price range: $2,001 and up.

Now that you're acquainted with some hooping basics, you're ready to get down to business. Though you probably won't master the art of hooping right off the bat, remember that every job is a learning experience, and before long, hooping will be second nature to you.

Information for this article was gathered from the following sources: **"Hooping Essentials,"** *Starting Your Embroidery Business 1994, Deborah Jones;* **"Jumping Through Hoops,"** *May 1994, Deborah Jones;* **"The No- Hoop Solution,"** *August 1994, Deborah Jones.*

Monogramming:
Placement & Accessories

WOMENS' WEAR

Womens' Robes, Blouses, etc.
Place 4" to 6" down from the left shoulder and 3" to 5" over from center.
Line — 1" to 1¼". Diamond — 2" to 3"
If the garment has raglan sleeves, lay it so the front and back sleeves match. The fold across the shoulder becomes the shoulder seam reference point.

Womens' Sweaters
Place 3½" to 4½" down from the collar and centered on the front.

Womens' Dress Shirt/Blouses
COLLAR: On left side, ¼" above button hole, centered between collar edges,⅜" to ¼". Collar monograms are more popular for women than men. On all women's dress shirt monograms, thread color often matches the garments color, or a gold or silver metallic thread is used.
CUFF: Fold the left cuff in half across the width. Stitch monogram 1" from fold toward button hole and ¼" from the cuff's top stitching.
Line — ¼" to ½" to ¾".
PLACKET: Between second and third button hole.
Line — ¼" to ½". Diamond — ½" to ¾".
POCKET: Center of pocket hem, ¼" to ½" from top pocket.
Line — ¼" to ½". Diamond — ½" to ¾".
Left Side: 4 to 6" from shoulder seam and halfway between placket or center and sleeve seam.
Line — ¼" to ½". Diamond — ½" to ¾".

Womens' Fur Coat Linings
On the right or left side at waist level 3" from lining seaming.The lining seam will have to be opened for proper hooping.
Line — 1" to 1¼". Diamond —2" to 3".

Womens' Sport Shirt
On left side 4" to 6" down and halfway between placket and sleeve seam.
Line — ¼" to ½". Diamond —½" to ¾".

Womens' Sweaters/Sweatshirts
Center: Measure 3½" to 4" from collar seam, center on collar.
Line — 1" to 2". Diamond — 2" to 3".
Left Side: Measure 4 to 6" from shoulder seam, 3 to 5 from center of garment.
Line — ¼" to ½". Diamond —½" to ¾".
For both center and left side positions if garment has raglan sleeves, lay it so front and back sleeve seams match. The fold across the shoulder becomes the shoulder seam reference point.

GENERAL

Satin Jackets
For designs on the left breast area, place 3½" to 4" over from the center edge and 6" to 8" down from the shoulder seam.
For the back of the jacket, the placement depends on the size of the design and the size of the jacket. A design or lettering can be centered anywhere from 6" to 9" down from the seam on the collar.
Monograms and names should be placed on the left front unless otherwise specified. For children's clothing, these measurements should be scaled down.

Shirt Cuffs
To place the monogram in the top center of the wrist, start 1" from the center of the cuff toward the button hole and ¼" to ½" above the cuff edge. The bottom of the letters should be at the bottom of the cuff.
Line — ⅜" to ¼". Diamond —½" to ¾".

Shirt Pockets
¼" to ½" down from the pocket edge and centered between seams.
Line — ¼" to ½". Diamond —¼" to ½".

MENS' WEAR

Mens' Dress Shirt
COLLAR: On left side, ¼" above button hole, centered between collar edges, ⅜" to ¼". The collar stay may need to be removed for stitching and then replaced. Inform your customer and adjust price accordingly. Some do not recommend this placement.
CUFF: Fold the left cuff in half across the width. Stitch monogram 1" from fold toward button hole and ¼" from the cuff's top stitching.
Line — ⅜" to ¼". Diamond — ½" to ¾". For men's dress shirt monogram's thread color often matches shirt color.
EUROPEAN: Place 4" to 6" below pocket, center on pocket.
Line — ⅜" to ¼". Diamond — ½" to ¾".
POCKET: Center of pocket hem, ¼" to ½" from top pocket.
Line — ⅜" to ¼". Diamond — ½" to ¾".
If a pocket hoop does not allow proper hooping, you may have to remove one edge of the pockets top stitching, fold it away from the garment for stitching and restitch pocket after embroidery is done. If pocket has a flap, center in flap. If pocket has button closure or button flap, place monogram slightly to right of button hole.

Mens' Golf Sweaters, Robes, etc.
Place 7½" to 9" down from the left shoulder and 4" to 6" over from center.
Line — ½" to ¾". Diamond — ¾" to 1".
If the garment has raglan sleeves, lay it so the front and back sleeves match. The fold across the shoulder becomes the shoulder seam reference point.

Mens' Sport Shirt
On left side 7" to 9" down from shoulder seam and halfway between placket and sleeve seam.
Line — ¼" to ½". Diamond — ½" to ¾".

Mens' Ties
2" to 2½" from bottom tip or 9" to 11" from bottom tip if worn with vest.
Line — ¼" to ½". Diamond — ½" to ¾".

HOUSEHOLD

Table Linens
RECTANGULAR TABLE CLOTH: Two monograms, each halfway between center and edge. Monogram Size: 3" to 4".
ROUND TABLE CLOTH: One monogram anywhere 2" to 3" from edge. Monogram Size: 3" to 4".
SQUARE TABLE CLOTH: One monogram toward the corner halfway between center and point. Monogram Size: 3" to 4".
NAPKIN: If the napkin is large enough to be folded in thirds, place the monogram in center of one side so it shows when napkin is folded. If monogram folds in half, place the monogram in corner or center between fold and edge. Monogram is ½" to 1" from the edge.

Sheets/Pillow Cases
Top Sheet: Bottom of monogram should be centered about 2" above the wide hemline on the top of the sheet. Monogram Size: 2½" to 4".
Stitch right side of fabric with the bottom of the monogram at top of sheet. Monogram should be readable from foot of bed when sheet is turned down.
Pillow Case: Centered between the edge of the open end and the stitching on the hem or the border design. Monogram Size: 2" to 2½" . Before hooping, be sure pillow case is positioned with side seam at top, away from you.

Towels
HAND TOWEL: 1½" above border. Monogram Size: 3".
BATH TOWEL: 2" above border. Monogram Size: 4".
BATH SHEET: 3" above border. Monogram Size: 5".
BATH MAT: Center of mat.
WASH CLOTH: 1" above border. If there is no border, monogram can also be placed in a corner. Monogram Size: 1½".
FINGER TIP TOWEL: Monogram Size: 2".

MONOGRAMMING ACCESSORIES

- Clippers/Nippers
- Tailors' Chalk
- Cut-Away Backing
- Seam Ripper
- Good Lighting
- Optional: Bobbin Spools
- Rulers—6" and 12"
- Plastic Wrap
- Tear-Away Backing
- Masking Tape
- Needle Threader
- Comfortable Stool
- Scissors
- Peg Board
- Pins

TECHNIQUES & PRACTICES

by Ken Parsons

PLACEMENT – CRITICAL TO SUCCESSFUL GARMENT MONOGRAMMING

Embroidery Business News – August 1994

Monogramming garments can be a lucrative part of your business because of its very nature - almost anything you can wear can be monogrammed. The technique gives individuality and personality to even the most mundane shirt or sweater. And, probably because we are all vain at heart, we love monogrammed goods.

The factor – placement – is critical to successful monogramming.

PLACEMENT

At one time, traditional men's monogramming was very simple. The only monogrammed item was a dress shirt, adorned with 1/4 inch high lettering on the cuff, the pocket or, for adventurous types, the collar. The only exceptions to this rule were pajamas and robes. Because these garments were not worn in public, placement of the monogram was much more obvious and its size much larger.

Modern monogramming has taken a much rigid turn. Today placement is nearly unlimited, although subtlety still is the key factor. For example tone-on-tone monograms are the most effective.

In Europe, although monogramming is not as popular as it is in the United States, the usual placement is 4 inches centered below the chest pocket. American designers including Tommy Hilfiger have adopted this placement for their logos.

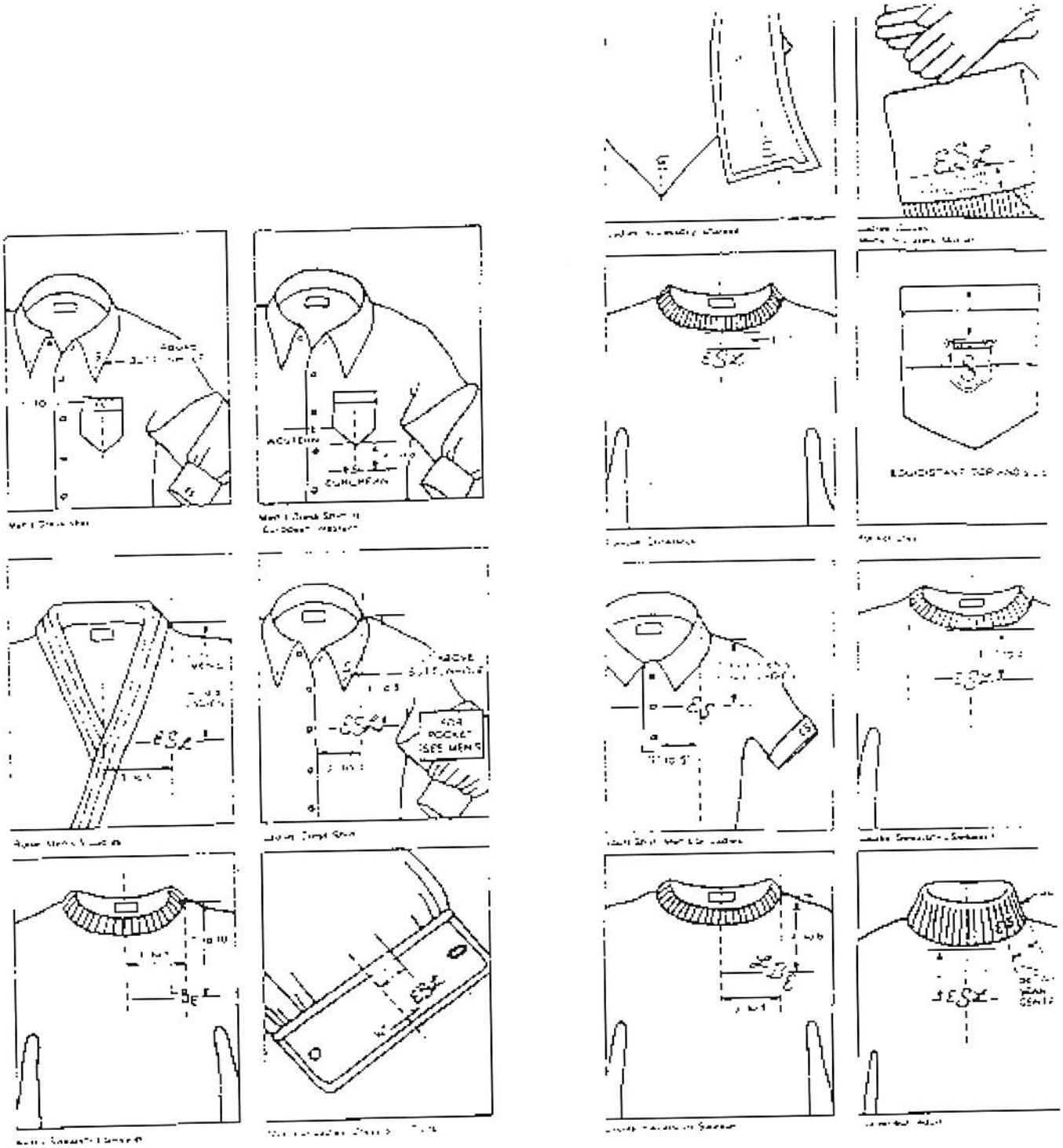
The popularity of country music and Western clothing also have steered monogram placement to the button placket, both on the outside, to show when a shirt is closed and worn with a bolo tie, and on the inside, to show when the shirt is worn with the top buttons open.

Women's monogramming is more diverse because of the greater variety of items that can be monogrammed. On a fur coat, for instance, the monogram is place on the inside lining at waist level 3 inches from the lining seam. This practice became common in the 1940s when the incredible popularity of the short fox coat made it impossible for a women to distinguish her coat from anyone else's without a monogram. Even today, it is assumed that when you buy a fur coat you will have it monogrammed.

Monograms on sweaters also remain popular, the most famous being the big "L" on Laverne's sweater in the 1970s TV sitcom "Laverne & Shirley". Though exaggerated, Laverne's monogram was typical on the 1950s, when the monogram was a fashion statement. The varsity sweater with its chenille letter and embroidered name was everywhere. The centered monogram combined with floral motifs also was born during this era and still is popular today, along with embroidered handbags and gloves.

Stitches Magazine's Monogram Placement Chart

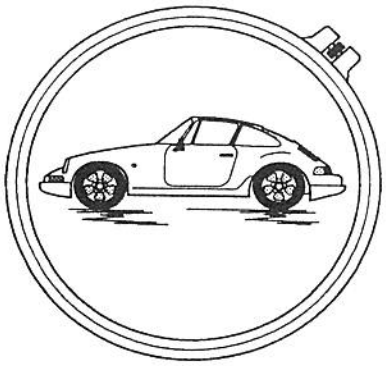
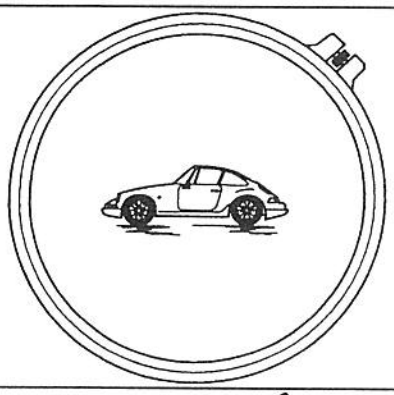
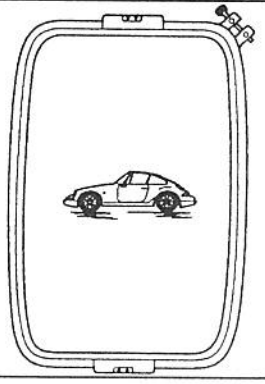
These charts show general guidelines for lettering and design placement on several popularly monogrammed items. Placement will vary depending on garment and monogram size. For the final word on placement, always consult with your customer.



DETERMINING THE APPROPRIATE FRAME FOR THE DESIGN

It is necessary to select a frame which matches the size of design. Refer to Fig. 7-1.

If a frame that is too large for the design is used, problems such as incorrect arrangement of the pattern and low-quality stitching due to stretching of the fabric tend to occur.

Good/Bad	Frame Selection	Embroidery Results
Good		The frame size is appropriate for the design.
Bad		The frame size is not appropriate for the design. When embroidering on a fabric that stretches and contracts, the pattern position will shift or the embroidery quality will be lowered.
Bad		The frame size is not appropriate for the design; the frame upper/lower margins are too large.

Hooping

CARE OF PLASTIC HOOPS

The small brass adjusting screw is usually the first item to break on plastic hoops. This screw is different from those on wooden hoops, and it is designed to be adjusted by fingers. It will also stand tightening with pliers. However, be sure not to overtighten; it's bad for the garment and the hoop. Plastic hoops are not adversely affected by room temperature and dryness, but they shouldn't be stored in strong sunlight. As with wooden hoops, store them on hooks.

CARE OF WOODEN HOOPS

Hoops are expensive, and wooden hoops require special care. Hang hoops up when not in use. They will become warped, chipped and damaged rattling around in a drawer with other hoops. Insert and remove the hoops from the machine by holding the bar or metal braces; never push or pull the wooden hoop. Match the hoop's inner and outer parts, and use them with their mates ONLY. Adjust the screw before pressing the garment and inner hoop in place. Do not necessarily use the screw as a tightener.

Prevent presser feet and needles from hitting the hoop. It does not do the hoop or the machine any good! If the hoop has cracked as a result of a needle hit, it can be glued together very effectively with white wood working glue. Spread the crack slightly by pushing an old needle into it, then squeeze glue around the needle. Pull the needle out, place plastic film over the glue spot and clamp the crack closed overnight. Sand the hoop with fine sandpaper.

To be correctly repaired, the hoop needs to be taken apart, welded and reassembled, which can also damage the wood if carelessly done. The blind rivets should be the shallow countersunk type and must not be over tightened or the wood will break. The welding precautions also apply to plastic hoops with bars.

MARKING WOODEN HOOPS

Oval wooden hoops are not manufactured symmetrical. Mark each hoop in the following manner:

- Find the horizontal center. Draw a vertical line through it and mark the inner and outer hoop where the vertical line crosses the top and bottom of the hoop.
- Make an extra mark at the top only on both the inner and outer hoop. Mark each pair differently; this will ensure that the correct inner is used with its outer.

MARKING THE GARMENT

There are several marking utensils available on the market: tailors chalk, marking pens, straight pins, and masking tape. Simply make a horizontal mark on the garment exactly where the embroidery is to go, and align it with the marks on the hoop. Of course, if your mark is crooked, your embroidery will be crooked too.

The use of a marking pen or chalk may not be suitable for some garments. For example, sweaters will stretch and the line will become distorted. Straight pins are a good alternative in this situation. Use the longest straight pins you can buy. Pin the garment twice with each pin so that it is secure at both ends. This ensures the line formed by the middle of the pin will remain straight as the garment is hooped.

HOOPING THE GARMENT

Hooping on the machine is not easy, time-efficient or good for the machine, so plan to hoop on an adjacent table. A table-top hoop holder screwed to a framing board should be used. Basically it holds the hoop in the same position it will be on the machine, so that you are assured that the embroidery will be straight.

TIGHTENING THE HOOP

Hoops with screwdriver-adjustable screws often have a problem with the screws twisting off, or the slot in the heads wears out. To prevent this, treat the screws as an adjusting screw, not a tightening screw. Lay the garment over the outer hoop, put the inner hoop on top and press straight down. If the garment is not gripped tightly enough, remove the garment, tighten the screw with your fingers and fit the inner hoop again. When the adjusting screw is correctly set, the inner hoop should press firmly into place, stretching the fabric slightly. Adjusting the screw after the inner hoop is pressed down will actually loosen the fabric as well as wear out the screw prematurely. There will be times when adjusting the screw after the garment is hooped is necessary, as when hooping across seams and pockets or thick spongy fabric. However, to preserve the hoop screws, use steel screws and the correct screwdriver. Oil the screw occasionally with the slightest amount of oil, and avoid over tightening. If you are hooping over seams, the hoop will tighten over the seam, not the layer of fabric, and possibly break. To achieve even hooping, try a thin strip of cardboard placed between the inner and outer hoop as needed.

HOOPING SPECIFIC FABRICS

Corduroy

A higher stitch density as well as the topping may be necessary to prevent stitches from sinking into fabric wales.

Knits and Sweater Knits

Hooping knits can be difficult. Pin or mark a horizontal line on the garment without stretching the knit. Then lay a piece of cut-away backing over the outer hoop, place the garment on the backing and press the inner hoop in place. Avoid the temptation to pull the garment into alignment. This can result in wavy embroidery, crooked lettering or puckered fabric. If the fabric isn't straight, take it out and start again. In some cases, a facing will be needed on knits to improve the embroidery. Facing can be placed on the fabric before the inner hoop is pressed in, or a loose piece of film can be held on top of the garment just before stitching. Tightly woven sweater knits may need just one layer of backing; wide-wale bulky knits may require more topping. Plastic wrap is preferred on bulky knits, because it prevents the wales from poking through the stitching after repeated washes.

Lycra or Spandex

Use round hoop. Stretch garment to wearing size in hoop so finished embroidery will not be distorted when customer is wearing it. Explain to the customer that embroidery will look puckered when garment is not being worn, but will stretch into shape when the garment is worn.

Nylon Windbreaker

If garment slips in hoop and design registration problems occur, try wrapping hoop with masking tape or twill tape to provide a rough surface to grip fabrics tighter.

Satin Jackets

Hoop tightly. If the garment still slips in hoop and registration problems occur, wrap hoop with masking tape or twill tape to provide a rough surface to grip fabrics tighter.

Sweatshirts

High-detailed designs may require 2 layers of backing.

Terry Cloth Towels

Plastic wrap does a better job of preventing terry's loops from poking through stitches on high-loop terry that will be washed repeatedly.

Vinyl

Reduce sewing speed. Use the smallest needle possible per weight of the vinyl to avoid the formation of large holes that could cause the embroidery design to tear out of the fabric. Hoop marks on vinyl can be a problem. Hoop the backing and adhere the garment to it with double sided tape. Lightweight vinyl may require more backing.

Applications For Hooping

Hats for 270°:

1. When hooping hats always use hat backing.
2. Place the backing on the cap gauge from ear to ear. (Always hoop for 270° even when sewing only on the front panels.)
3. Lift the sweat band out of the hat.
4. Slide the hat on the hat frame.
5. Pull the lid of hat frame across the hat, making sure the teeth of the lid lines up with the bottom of the hat.
6. Be sure the center of the cap is in the center of the cap frame.
7. When fastening clips to the side of the hat, make sure the sides of the hat are straight to ensure good registration when sewing.

T-Shirts and Sweatshirts (left chest):

Lay the shirt flat and place a piece of masking tape where the center of the design should be. To check if placement is correct, place the hoop so that the top of the hoop (where the screw is located) is centered under the edge of the collar, approximately 2" from the bottom of the collar. The left side of the hoop should also be about 2" from the center of the shirt. If in doubt, pick up the shirt and hold against your body to double check placement.

Full Front or Full Back:

When hooping, the top of the hoop should be approximately 2" from the bottom of the collar. The highest point of your design should be 3" from the bottom of the collar. On a full back of a hooded garment, be sure to place your design low so that the hood does not cover the entire design.

Hints on Avoiding Hooping Hazards:

1. Use good cutaway backing. Several layers may be necessary to cross the grains and provide extra support. Make sure the type of backing used is appropriate for the fabric. For example, a heavier backing may be needed for non-stable garments such as sweaters, piques, or jersey knits, and a thinner backing may not work for corduroy or satin and quilted jackets.
2. Keep the backing in place with tape or clips (if you are using a hooping board) to avoid slippage.
3. Make sure the material is tight enough in the hoop, but not too tight. There must be enough room for the thread to move without pushing the fabric. Make sure the material is pulled straight up and down to go with the grain of the fabric, rather than right to left.
4. Double-check the position of the garment. Sometimes the fabric will slide out of position when the hoop is pushed into place. Placement is essential for chest logos, which should not be too high or over too far, but centered along the chest line.
5. If the garment has a pocket, notice whether it is straight. If the pocket is crooked, you may need to ask the customer how he wants it.
6. Consider using a designated hooper on some orders so the operator can keep up with the machine. Operators can also have extra frames on hand to maximize downtime.
7. Clean up the work area between orders, using an air compressor to blow off any lint buildup. Machines should be wiped down and hooks blown between jobs.
8. To avoid hoop marks, make sure the hooping frames are not too tight. If an order cannot be finished until the next day, do not leave it hooped. Also, have a steamer on hand to steam out hoop marks.

MARKING AND HOOPING

Marking The Garment

There are several marking utensils available on the market: tailors chalk, marking pens, straight pins and masking tape. Simple make a horizontal mark on the garment exactly where the embroidery is to go, and align it with the marks on the hoop.

Of course, if your mark is crooked, your embroidery will be crooked too.

The use of a marking pen or chalk may not be suitable for some garments. For example, sweaters will stretch and the line will become distorted. Straight pins are a good alternative in this situation. Use the longest straight pins your an buy. Pin the garment twice with each pin so that it is secure at both ends. This ensures the line formed by the middle of the pin will remain straight as the garment is hooped. Place a triangle against the shirt to assure a straight line.

Hooping The Garment

Hooping on the machine is neither time-efficient nor very easy, so plan to hoop on an adjacent table. A table-top hoop holder screwed to a framing board should be used. Tragically it holds the hoop in the same position it **will** be **on** the machine, so that you are assured that the embroidery will be straight.

Care of Plastic Hoops

The small brass adjusting screw is usually the first item to break on plastic hoops. This screw is different from those on wooden hoops, and it is designed to be adjusted by fingers. It will also stand tightening with pliers. Plastic hoops are not adversely affected by room temperature and dryness, but they shouldn't be stored in strong sunlight. As with wooden hoops, store them on hooks.

Heading Off Common Problems In Jacket Embroidery

by Ken Parsons

Although jackets are probably the easiest garments to embroider, there are a few tips that can help head off the most common problems encountered.

Materials

When sewing on jackets, first make sure you are using the proper needles, backing and hoop or frame. Jackets come in many different fabrics, the most common of which are satin, wool melton (varsity jackets), poplin and nylon. For all of these fabrics, you would use a sharp-point needle. I prefer a DB/XK5. For satin and nylon, I would use a size 70/10, and for poplin and wool, a size 80/12. The DB/XK5 is a nice needle to use because the eye is one size bigger than a standard needle and much easier to thread, especially in a size 70/10. It also is reinforced on the upper part of the shaft, which keeps it from deflecting or bending when it goes through heavy fabrics. When a needle bends, there is a good chance that it will hit the needle plate instead of going through the hole in it, which breaks the needle. The needle also could hit the hook and break and could scratch the hook as well, forcing you to polish or replace it.

Backing

Because jackets generally are manufactured from very stable woven fabric, a tearaway backing is sufficient. One of the problems with sewing on a pre-assembled jacket is that the bobbin thread can be seen on the jacket lining. You can make this less obvious by using black bobbin thread and black backing, or you can eliminate it by embroidering on jacket panels to be assembled afterward. The only problem with this method is that it is much more time consuming. You must add to your production schedule the time it takes for your supplier to ship the panels to you, the time needed to ship the panels to the assembler and the time required to ship the assembled jackets back to you.

Hoops

Hooping is probably the most difficult part of sewing on a jacket. Double-height hoops specifically were designed to make trooping jackets easier. If your machine manufacturer doesn't offer double-height hoops, wrapping your hoops with athletic tape makes them grip better, especially on satin jackets. As with all garments, always use the smallest hoop possible for the design you are sewing. The smaller the hoop, the tighter it will hold the jacket. Also remember that round **hoops hold** tighter than square or rectangular hoops.

A few automatic trooping systems also are available, developed in part to make the trooping process for heavier garments more effortless.

Density

For embroidering jackets, generally use a density of G5 stitches per inch, although you may want to go up to 80 stitches per inch on lined woolen jackets (based upon using 40-weight rayon thread). If you have large fill areas of a light color on a dark jacket, you can use a sheet of light tearaway backing on the top of the jacket where the fill will be sewn. Sew the fill on the backing, and when the fill is done, you can tear off the excess. This adds density to the fill pattern without adding stitches because you see the light-colored backing between the stitches instead of the dark jacket color.

Placement

A design should be centered anywhere from 6 inches to 9 inches from the neck seam, depending on the size of the jacket and the size of the design. Larger designs would be centered lower than smaller designs.

Left-chest designs would be placed 3-1/2 inches to 4 inches from the center and 6 inches to 8 inches from the shoulder seam.

Lettering Sizes

If you are sewing letters on the back of a jacket, the size of the lettering is, of course, limited by the length of the words. Average lettering size is from 2-1/2 inches to 4-1/2 inches. Lettering usually is placed on an arc, with the total size of the arc from left to right usually 9 inches to 11 inches.

Utilizing Fill Stitches

When you choose your lettering size, make sure that the columns that make up the letter are not too wide. If a column stitch is more than 3/8-inch wide, it becomes very fragile. When a stitch of that width is placed on the back of a jacket, it can become caught on something and cause the entire column to fray or unravel, ruining the embroidery.

One way to counteract this without reducing the size of your letters; is tO change from a column stitch to a split or fill stitch. Both of these stitch types divide up the distance from one side of the column to the other into smaller stitches, making the design much more stable.

Tackle Twill

You also may choose to use tackle twill letters instead of embroidery for large lettering. Tackle twill letters are precut applique letters that can be hand sewn to your garment with a zigzag machine or applied with your embroidery machine. Many machine manufacturers have tackle twill fonts that can be used with precut tackle twill letters. This method greatly reduces the stitch count and the sewing time.

Flat or Tubular?

Many embroiderers with tubular capability on their machines avoid sewing on a flat table whenever possible. Although this is not necessarily a bad practice, it makes sewing on heavy jackets difficult. The sub table of the tubular machine supports a substantial amount of the jacket weight, but not all of it. Therefore, as the jacket moves back and forth while being sewn, it has a tendency to loosen; as the jacket pulls down, the inside of the hoop is forced Up until it pops out. There are some tubular hoops available with a double-height inside and a single-height outside, which solve this problem in most cases. If you can sew on the flat table configuration of your machine, however, I would recommend it.

Jacket-back designs themselves, mainly because of their size, are very challenging to digitize as well as run. Because of the value of the jacket and the rime the designs take to run, take all the proper precautions before you begin.

Ken Parsons is director of public relations for Hirsch International Corp. He has been involved in the embroidery industry for 13 years, as a digitizer, trainer, customer service manager, director of operations and company vice president.

Embroidery On Knits

By Ken Parsons

As with all embroidery, you must start with the proper tools. These are needle, backing, hoop, thread, tension, and design.

Needle

Ball point needles are used for knit goods. There are three types of ball point needle: light ball, medium ball, and heavy ball. The easiest way to decide which is best is to choose one based upon the weight of the knit to be embroidered. Light ball is used on light knits (t-shirts, golf shirts); medium ball on medium knits (sweatshirts); and heavy ball on heavy or bulky knits (sweaters). Knits also require a relatively thin needle. Once again base this on the weight of the knit. A fine thin knit, such as a lisle golf shirt, would require a fine needle, such as a 65/9 (remember to use a large eye needle, DBxK5, to make it easier to thread). You would follow this same rule for medium and heavier knits. For medium, use a 70/10 and heavy, use a 75/1 1, or an 80/12.

Backing

Tearaway is traditionally the most popular backing. When embroidering on knits, it is not always possible to use tearaway. The embroidery can tear away from the backing and loose its stability when embroidering a large design. This causes the design to lose registration and your garment will be ruined. The good news is that these are many different grades of tearaway and with experimentation it is possible to find a tearaway to work with some knits. Sweatshirts, for example, usually embroidery very well with tearaway backing. Another option is using multi-layers of tearaway. One possible problem with using multi-layers is that it can make the embroidery very stiff. When you place a stiff embroidery on a soft knit it will either stand out away from the knit or pucker around the edges.

The best looking embroidery on knits is very soft and conforms to the fabric around it. To help create this effect a two new products have come on the embroidery market. The most popular is a woven backing that is very similar to organza. It may be used alone or with a layer of light cutaway behind it. This new product is available through HIRSCH, it is offered in 21" x 50yd. rolls. The other product, which is also new, is a flame retardant backing. This product is extremely soft and thin, however it is very strong. It is also available from HIRSCH in both rolls and cut pieces. For details on both of these products call them at 1-800-883-3799.

Toppings

There are some knit products which have a very uneven surface, such as pique and most sweater knits. These products require a topping to keep the stitches from being lost in the knit pattern. There are many products available which can be used for this purpose.

The most widely used is a water soluble topping called Solutex. It is available in two weights from HIRSCH, and can be purchased by the yard or in individual 36" x 100 yard rolls.

Cellophane dry cleaners bags can also be used but their removal is a little bit more difficult. The remaining cellophane must either be picked out by hand or may be heated which will cause it to shrink and may then usually be brushed off.

Hoops

As with all embroidery, always use the smallest hoop possible for the design that you are embroidering.

When placing your knit fabric in the hoop, do not stretch. The fabric should only be tight enough to lie flat in the hoop. If the knit is stretched while being embroidered, the fabric underneath the embroidery remains stretched and the rest of the fabric contracts when you remove it from the hoop. This makes your embroidery stand out from your fabric or causes the knit around your embroidery to pucker.

Stretching the fabric can also cause the knit to tear around your embroidered design. You must remember that even ball point needles are sharp and can cut. A fabric is in its weakest condition when it is stretched and is very prone to damage.

Tension

When sewing on knits tension becomes more important than ever. Because knits are unstable goods you will experience diminished column widths if your tensions are too tight. Tensions must, of course, be balanced as always but must not be too tight.

Designs

Designs run and look best on knits when they are digitized very loosely. If you need to use a fill stitch make sure that you keep you density loose. Use a crisscross underlay to compensate for the low density. Underlays are important for all types of stitches.

When using column stitches use edge walk for thin columns and a combination of zig zag and edge walk for thicker columns. Also remember to avoid long stitches on knits, and keep column stitches under .25".

Leathering Heights
Overcoming The Fear Of Leather

by Ken Parsons

Leather is probably the most feared surface for embroiderers. There are three very good reasons for this: leather is expensive, you cannot remove stitches and start over if you make a mistake and, finally, leather does not possess any of the characteristics of woven or knit goods, the most embroidered and most familiar materials in this industry.

When you embroider on leather, you are punching holes in the leather. These holes are permanent. If you place these holes too close together, you will cut your design out of the leather and will be left with a piece of leather with a hole in it the shape of your embroidered design. To prevent this, you must make sure of two things: your density must be reduced and your design cannot contain any short stitches. Let me clarify.

Density, Underlay Stitches Important

The amount by which you must reduce your density is based on the type of leather upon which you are embroidering. As a rule of thumb, I would reduce the density by 20 percent. You are probably thinking this is not going to produce very good looking embroidery, and you're right. We must now go in and add enough underlay to make up for the reduced top density, and the way you put in your underlay is just as important as the amount of underlay you put in.

Remember that your underlay-stitch needle penetration cannot land in the same place as your top-stitch needle penetrations, so make sure your underlay stitches are placed at least 1/16-inch in from the outside edge of your column stitch. If you are using a fill stitch, place you underlay at a 45-degree angle to your fill stitch and make sure your underlay and fill stitches are at least 4 millimeters long. The underlay should run in both directions at a 45-degree angle, going left to right and then right to left, both times at an angle to the fill stitch. IN making column stitches, the width of the column determines the type of underlay to be used. If your columns are less than 6 millimeters in width, use a running-stitch underlay running down the center of your column. On wider columns, use a combination running stitch and zigzag stitch, making sure that the width of your zigzag stitch is 1 millimeter in from the outside of the column. (A 6-millimeter column would use a 4-millimeter zigzag stitch.)

Use The Right Needle

Once you have the design set up correctly make sure you are using the right needle. There are four different possible needles to use: sharp, wedge, diamond and tripoint. Sharp needles are the most readily available. They do not have the cutting ability the others have and they create the biggest holes, but they will work. Wedgepoint needles also are very easy to come by but create smaller holes than the sharp-point needles which close slightly after the needle lifts out of the leather, making the needle holes less obvious.

The two best needles to use are the tripoint and diamond point. Both of these needles create self-closing needle holes, making the needle penetrations almost invisible. Both needles also cut through leather very effortlessly. These two needles were designed specifically for use on leather and are two of the most popular needle choices of shoemakers and other sewing machine operators who work predominantly on leather. These two needles are more expensive and usually must be special ordered, but they are the best.

Backing is not necessary when sewing on leather, except in extreme cases. Very thin leather such as kidskin stretches and backing should be used to stabilize it. If you use tearaway, be very careful when removing it; always tear away from the embroidery.

Backing also is suggested if you are forced to run a design that was not punched for leather. Cutaway backing will help keep the leather from ripping, but ie is not a foolproof solution and you should avoid the problem whenever possible.

Avoiding Hoop Marks

The last point to consider is hooping. You cannot iron out hoop marks when working on leather, so you have to avoid making them in the first place. To put it simply, if you don't use a hoop, you won't get hoop marks.

There are three ways to stabilize leather without trooping. The ideal way to embroider on leather is to work on cut pieces before they are assembled. You can cut holes in the seam allowance of the cut pieces that line up with pegs on the holding device, then lay the cut piece on the holding device with the pegs and place on the machine. The same method can be used by making a holding device from a sheet of plywood. Get the plywood in the shape of the cut piece, then Cut a hole in the center large enough to accommodate the embroidery. Nail in 3/4-inch nails from the bottom up so that they protrude 1/4 inch out of the top of the plywood holding device, 3/8 inch from the outside of the holding device around the perimeter of the device. Attach a bracket and your holding device is ready to use.

Lay your cut piece of leather on top of the holding device with the nails holding the leather along the seam allowance. The same holding device can be created by substituting double-sided tape for the nails; another way is to use a magnetic framing device, which uses two magnets to clamp on top and bottom of the leather, holding it in place. A fourth way.to hold leather is by trooping a piece of tearaway backing, spraying it w~th spray adhesive and gluing the leather piece to the trooped backing.

When embroidering on assembled pieces, most times you will need to use a conventional hoop. In these cases, you can wrap your hoop with athletic tape to help minimize the hoop mark and, at all times, only tighten the hoop as much as you need to hold the garment. Never overtighten the hoop. Another possibility is to hoop the garment With a piece of backing on top of the leather and then cut out the center area where the embroidery will be sewn, creating a window. The backing will act as a cushion between the leather and the hoop, decreasing

the chance of a hoop mark. If you still get hoop marks after taking these precautions, they usually can be removed by rubbing the leather against itself.

Polyester Thread Preferred

Thread also is a very important consideration Rayon still is the most popular thread for most applications, but polyester definitely is the thread of choice for leather. Strength is the key advantage of polyester—rayon does not possess the tensile strength necessary for sewing without thread breaks.

Cotton also will work very well, but because of irs lack of sheen, it is not very popular for leather applications.

If you follow all these parameterS, embroidering on leather should be as trouble-free as any other sewing application.

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