

## Denim – Optimizing Seam Performance

Selecting the proper thread for denim garments is very important to minimize sewing and seam performance issues. There is an old saying that:

*Thread only makes up a small percent of the cost of the finished product ... but shares 50% of the seam responsibility.*

A typical pair of adult size jeans will have from 200 to 250 yards of thread in them depending on the seam construction. Most major jean manufacturers have experimented with different thread types to reduce cost but most have found that corespun threads give the best overall performance. Most jean manufacturers put their products through various wash processes after manufacturing and some of these processes can be very harsh. The cost of these wash-processes can be from \$.75 to \$3.00 per jean depending on the chemicals, stones, enzymes and process time required. The amount of thread used in a jean typically costs between \$.25 and \$.30 while the wash-process can cost up to \$3.00 per jean.

The thread must be able to withstand all of these processes ... and hold the seams together for the life of the garment.

When you talk about sewing denim, there are five key issues that need to be considered:

- 1) What is the weight denim?
- 2) How large of topstitching thread is required?
- 3) What finishing procedures will the jeans be subjected to?
- 4) What quality issues need to be addressed?

With these questions answered, you will be able to produce jeans that meet the requirements for today's variety in Jeanswear. From a basic 5-Pocket Jean to the most creative pair of High-Fashion Jeans, your sewing plant can produce the quality for each.

The thread of choice used by most quality denim garment manufacturers for topstitching and stress seams include:

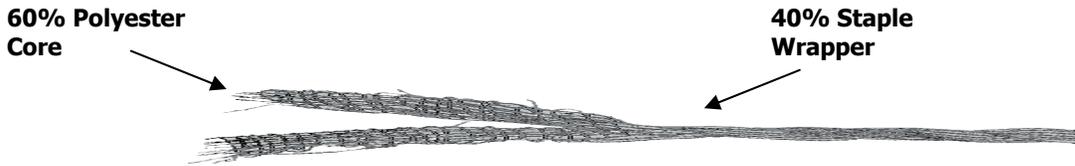
### CORESPUN THREADS:

Cotton wrapped Polyester Core – *D-Core® NWT*

Poly wrapped Polyester Core – *Perma Core® NWT*

### **CORESPUN THREADS**

Core threads are made by spinning a wrapped of cotton or polyester staple around a bundle of continuous filament polyester fibers to form a yarn and then two or more of these yarns are twisted together to form a corespun thread. Generally the core makes up approximately 60% of the thread construction contributing to a more uniform and higher tenacity sewing thread as compared to a 100% spun polyester sewing thread. For example, a T-60 PW Core thread will have a breaking strength of approximately 8.7 lbs. while a T-60 Spun Polyester thread will have a breaking strength a little over 5 lbs.



### Corespun Thread Construction

When wrapped with a cotton wrapper, corespun threads have very good needle heat resistance. When wrapped with a polyester wrapper, corespun threads have excellent chemical resistance and color fastness. The fibrous surface on either thread reduces the shiny look and also contributes to superior frictional characteristics as the thread passes through the sewing machine.

Some designers prefer the thread to wash-down during the wash processes and if this is the case, you would select a Cotton-Wrapped Core thread (*D-Core®*). Degrees of color fastness will vary with particular shades. With this known factor, a user of Cotton-Wrapped Core should look at all wash codes to insure the thread color will be appropriately maintained. We also recommend doing pre-production wash testing to assure that the wash-down look will be acceptable.

On the other hand, many jean designers want the thread to maintain its color for the life of the garment and offer a *signature* look. If color fastness is key, then select a Polyester-Wrapped Core thread (*Perma Core®*). Also with Polyester Wrapped products you have the option of picking the desired color from a color palette to obtain the look you want after the wash procedures. This will allow greater shade control, which will be maintained after continual washes by the consumer. We still recommend doing pre-production wash testing prior to going into production.

***Cotton-Wrapped and Polyester Wrapped Core threads offer excellent abrasion resistance to the varied wash codes the denim garments may be exposed to.***

### THREAD SIZE

Both of these thread types are available in sizes to meet the variety of denim fabric weights. From a Tex 40 to a Tex 120, you can achieve the desired performance throughout the sewing floor and after the varied finishing processes.

Utilize the correct size to obtain the desired look while maintaining seam integrity. Some basic sizes utilized in today's denim are:

<u>Needle thread</u>	<u>Looper thread</u>	<u>Serging</u>	<u>Application</u>
Tex 150 - T-300	Tex 80 or Tex 60	T-40 or T-60	Extra Bold appearance
Tex 120 to T135	Tex 80 or Tex 60	T-40 or T-60	Bold appearance
Tex 80 or Tex 105	Tex 60 or Tex 40	T-40 or T-60	Normal
Tex 60	Tex 60 or Tex 40	T-40	
Tex 40	Tex 40 *	T-40	

\*8 oz denim usage or Chino twills

## **Cut or Broken Stitches**

Most manufacturers of denim and twill garments that pre-wash garments after they are assembled have experienced problems with excessive “cut” or “broken” stitches. In fact many manufacturers have found this problem to be significant reaching in excess of 30 to 40% of the products being sewn.

Many times this problem occurs when a previously sewn stitch-line is crossed during a subsequent sewing operation and the needle damages the thread in the seam. Broken stitches can also occur when there is excessive abrasion or chemical degradation of the thread during the wash process. Let’s now discuss what are some of the major causes and solutions to these problems.



## **SOLUTIONS**

- Many manufacturers have significantly reduced the number of “cut” and “broken” stitches by using high-performance sewing threads on stress seams. Make sure the correct thread type and size are being used in both the needle and bottom (looper) positions. Core threads that have a continuous filament polyester core are much more resistant to cutting and degradation than 100% spun polyester thread constructions.
- Usually the larger the thread size, the more resistant the thread is to being cut by the needle or failure due to chemical degradation or heat. Because of this many manufacturers have increased the thread size on critical operations including waistbanding, seat seaming, etc. Typical thread sizes used on heavy denim run from T-105 down to T-60 depending on the desired look. Typical thread sizes used on twills used in the manufacturing of chino pants run from T-40 to T-60.
- Inspect the needle point at regular intervals and check for sharp or burred points. If the needle point is damaged, replace the needle. Many companies have found that it is best just to replace the needle on critical operations once or twice a day.
- Check for signs of needle heat or excessive heat exposure during laundering that may be melting the thread. Usually if the thread has been damaged by heat, the thread will have a hard melted surface that can be felt or seen using a magnifying glass. If you suspect that needle heat is a problem, try using a special coated needle or needle coolers to

reduce needle heat. Make sure the thread has the proper type and amount of lube. Most major thread suppliers have developed high-performance lubricants to minimize heat damage on polyester threads. A cotton wrapped core thread may be more resistant than a 100% polyester thread.

- Use proper thread tensions. Make sure the stitch on the seam line is loose and able to move if it is hit by the needle. Tight machine thread tensions will NOT allow proper flexibility in the stitch and will increase “cut-stitch” damage. Generally on chainstitch seams, the ideal stitch balance is when the needle loop on the underside of the seam lays over half way to the next needle penetration. This can be checked by unraveling the looper thread and observing the needle thread on the underside of the seam or checking the ratio of needle to looper thread. It is normally recommended that this ratio be approximately 60% needle thread to 40% looper thread consumed.
- Check the edges of the needle plate and presser foot needle holes to make sure they do not have any sharp edges or burrs that can damage the thread during sewing. Properly remove all burred or sharp surfaces making sure not to oversize the needle holes which can lead to excessive “flagging”.
- Inspect the feed dog teeth directly behind the needle holes and make sure they are not sharp. If required, buff the feed dog teeth with a wire wheel or with a stone if they appear to be sharp. Be careful not to remove too much of the feed dog teeth that could hinder the feeding or interfere with chaining.
- Use the minimum amount of presser foot pressure to get a uniform stitch length. Excessive presser foot pressure can cause the thread to be damaged when it is compressed against a relatively sharp surface. On some machines it is sometimes necessary to use a presser spring with fewer coils per inch to give more consistent pressure even when crossing heavy seams.
- The proper type and capacity folder should be used to prevent stalling when crossing heavy seams. Feed stalling will increase the chances of “cut” stitches.

#### **DAMAGE DURING PRE-WASHING**

- Sometimes partially damaged thread from the sewing operation will fail during stone washing or other processes. Most of the time this damage is difficult to detect but should be investigated using the suggestions mentioned on the previous pages. On the other hand, many seams are damaged during the wash processes due to excessive abrasion, chemical degradation, and heat degradation.



To reduce damage to the thread in the seams, we suggest the following:

- Make sure the correct thread type, construction and size is being used. For example, use Perma Core<sup>®</sup> NWT.
- Work with your laundry to develop standards with regard to the type and amount of chemicals, rocks, cycle times and temperatures that are being used in both the washing and drying processes. You should monitor and properly test the following:
  - Any changes of rocks and chemicals from one vendor to another
  - Changes of cycle times
  - Changes in temperature during the washing or drying cycles
- Evaluate the best way the garment should be processed, whether it should be inside-out or right-side-out, the fly buttoned or not buttoned, etc. Care should be taken if the garments are turned right-side-out when they are still wet. Extra moisture in the garments can cause excessive whipping of the bottom hem seam causing excessive damage.

### THREAD COST

Corespun threads generally have a higher purchase prices than spun polyester and air entangled threads. However, the total cost of thread which should include any additional maintenance costs related to thread sewing and seam performance generally makes corespun thread a real value.

### DO SEWING INTERRUPTIONS & REPAIRS NEGATIVELY IMPACT MANUFACTURING COSTS?




### CALCULATING LABOR & OVERHEAD COSTS RELATED TO PERFORMANCE

**Garment Description: MEN'S 5 POCKET JEAN**

		Production Units Produced	Current Thd Price	A&E Thd Price	Thread Price Difference	Current Labor & Overhead Cost	Labor & Overhead Cost using A&E Thread	Labor & Overhead Difference	Total Thread Cost
To see your potential savings, use your numbers in the 'yellow' boxes			Production times Current Thd Price	Production times A&E Thread Price	Current - Proposed	Production times Lbr/OH	Production times Lbr/OH - % Due Increase in Productivity	Current - Proposed	Thread Price Diff. - Lbr/OH Cost Diff.
<b>LABOR CONTENT (SAM) -</b>									
Standard Allow Minutes /Garment =	19.5	250,000	\$ 27,500	\$ 55,000	\$ (27,500)	\$ 281,667	\$ 252,373	\$ 29,293	\$ 1,793
Average Labor Cost per Hour =	\$ 0.80								\$ 0.0072
Average Labor Cost per Minute =	\$ 0.0133								
Overhead Cost to Labor Cost =	333%								
Avg. Labor Cost / Sewn Item =	\$ 0.26								
Est. Overhead Cost / Sewn Item =	\$ 0.87								
Total Labor & OH Cost/Sewn Item =	\$ 1.13								
"Good" Thread Combination Price Per Sewn Item =	\$ 0.110								
A&E "Better" Thread Combination Price Per Sewn Item =	\$ 0.220								
Est. Potential Increase in Production Efficiency using A&E Threads =	10.4%								

**GARMENT COSTING**

	%
Material & Trim	65
Labor	20
Overhead	9
All Other	6
<b>Total</b>	<b>100</b>

As you can see on the analysis above, using A&E performance sewing threads helped increase the Production Efficiency on this sewing floor by 10.4%. This was due to the fewer interruptions as compared to the production efficiency using a cheaper local spun polyester sewing thread. Increasing sewing efficiency not only decreases your through-put time to help meet shipping schedules, but it also reduces your labor and overhead cost per garment.

**DO REPAIRS AFTER LAUNDRY NEGATIVELY IMPACT MANUFACTURING COSTS?**

**COST CALCULATIONS DUE REPAIRS & SECONDS IN THE LAUNDRY**

	Current	A&E Thread
#of Repairs (% of garments needing repair)*	38.0%	3%
Average time to inspect and repair a garment (seconds)	45	45
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Units produced for Program	250,000	250,000
Number of Repairs after Laundry	95,000	7,800
Cost of Garment Repairs / Program	\$ 4,117	\$ 338
Percent of Garments that can not be repaired	0.15%	0.2%
No. of Garments Not Repairable	142.5	11.7
Cost/Garment Not Repairable	\$ 3.00	\$ 3.00
Total Cost of Garments Not Repairable	\$ 428	\$ 35
<b>Total Cost at Laundry/Program</b>	<b>\$ 4,544</b>	<b>\$ 373</b>
Laundry Thread Cost Difference	\$ 4,171	
Total Thread Cost from Production Floor	\$ 1,793	
<b>Total Thread Savings</b>	<b>\$ 5,964</b>	<b>\$ 0.0239 Per Garment Diff.</b>

\* See Cost Savings - Sewing Floor Sheet

This is an analysis showing the cost impact of repairs after finishing. As you can see from the example shown above, the A&E performance threads reduced the repairs over the local thread from 38% down to 3%. This reduction in repairs resulted in a reduction in repair costs of \$4,171 for the program. Combine that savings with the savings on the sewing floor and you can see that performance A&E threads actually generated a savings of \$5,964, not to mention the better quality sewn products being produced.

**Ways of Reducing Thread Cost**

In today's competitive market place, everyone must be concerned about costs. Ways of reducing thread cost without sacrificing in performance might include:

- Using high performance thread that reduces down time and rejects due to seam failure
- Using smaller thread sizes (example: using T-40 cospun thread on serging)
- Using natural instead of dyed thread on the loopers or inside threads
- Using a less expensive thread construction on non-critical seams. This might include using spun polyester or air entangled threads as looper threads or serging threads on the inside of the garment.

Your Thread Company should have an excellent Technical Service Team to assist with any questions you may have concerning Thread Application or Thread Specifications for any denim fabric you will sew. Also recommendations on the correct needle size and machine setup for obtaining the maximum efficiency for each operation.