Estimating Thread Consumption

Introduction

It is important to know the amount of thread consumed in a sewn product so you can: 1) Estimate the number of cones needed; and 2) Calculate the cost of the thread needed to manufacture the finished product. Thread consumption can be determined in several ways. To calculate the amount of thread in a seam, you can:

- Measure the actual amount of thread consumed in a specific length of seam.
- Calculate the thread consumption by using mathematical stitch formulas based on the thickness of the seam and the number of stitches per inch.
- Calculate the thread consumption using thread consumption estimates.

Measuring Actual Thread Consumed

A specified length of the seam, for example 3 inches, is measured on the seam and then the thread is removed by carefully unraveling the stitch. You can then calculate the amount of thread consumed in one inch and multiply this factor times the total length of the seam measured in inches.

Example:

- Length of seam is 42 inches or 1.17 yards.
- Stitch and seam construction: 401 SSa-1.
- Specified length of thread removed from a seam equals 3 inches.
- Needle thread removed = 9 inches
- Looper thread removed = 8 inches

Calculation:

- Needle thread factor = 9 ¸ 3 = 3 inches of needle thread per inch of seam.
- Looper thread factor = 8 ¸ 3 = 2.67 inches of looper thread per inch of seam.
- Total needle thread consumed = factor 3 X 1.17yds = 3.51 yds
- Total looper thread consumed = factor 2.67 X 1.17yds = 3.12 yds
- Total Thread = 3.51 + 3.12 = 6.63 yards per seam.
- Generally, a 15 to 20% waste factor is added due to chaining-off, thread breaks, repairs, etc.
- If a waste factor of 15% is selected then:
- 6.63 yards/seam X 1.15 = 7.62 yards/seam including 15% waste factor.

Obviously, you must do this for each seam to determine the total amount of thread consumed in the finished product.

Thread Consumption Formulas

Union Special Machine Company published a "Thread Consumption Booklet" that consists of a number of thread consumption formulas for various stitch types based on the stitch length and thickness of the seam. These mathematically derived consumption factors can be multiplied times the length of the seam to estimate the combined amount of top and bottom thread. On some overedge and coverstitch types it is necessary to also know the seam width or needle spacing to properly calculate the amount of thread consumed.

Example:

- Stitch and seam: 401 SSa-1
- Stitches per inch: 8
- Thickness of the seam: .075 inches (measured with a micrometer)
- Length of the seam: 42 inches or 1.17 yds.

Union Special 401 Chainstitch Chart	
Seam Thickness	**8 SPI**
.055	4.88
.060	4.96
.065	5.04
.070	5.12
.075	5.20

Consumption based on the mathematical equation:

C = 4 + 2ts
C = 4 + 2(.075 X 8) = 5.20

t = thickness of the seam
s = stitches per inch

1.17 yds X 5.20 = 6.08 yds / seam.
6.08 yds/seam X 1.15 = 7.00 yds per seam including a 15% waste factor.

Estimating Thread Consumption

As you can see from the Union Special chart, the more stitches per inch and the thickness of the seam impacts the amount of thread consumed. However, most heavy fabrics are sewn with fewer stitches per inch and most light fabrics are sewn with more stitches per inch. Therefore we have come up with the following estimates based on typical seam thickness and stitch length.

Stitch Type	Est. Total Consumption Ratio	Needle thread	Bottom thread
301 Lockstitch	3.0 to 4.0 (1)	50%	50%
401 Chainstitch	5.0 to 7.0	Lt. Wt. 40% (2) M. Wt. 50% H. Wt. 60%	60% 50% 40%
503 Overedge (2 thread) 504 Overedge (3 thread)	7.0 to 10.0 12.0 to 16.0	60% 25%	40% 75%
515 Safetystitch (4 thd.) 516 Safetystitch (5 thd.)	12.0 to 17.0 17.0 to 23.0	55% 37%	45% 63%

1. Use lower estimated thread consumption numbers for light-weight fabrics or long stitch lengths.

2. On the chainstitch construction, the amount of looper thread does not change unless the stitches per inch changes. On the other hand, the needle thread will change based on the thickness of the seam. Therefore, the percentage of needle thread goes up when the fabric gets heavier. Lt. Wt. (light weight) is generally like shirts and blouses; M. Wt. (medium weight) is generally like slacks or chinos; and H. Wt. (heavy weight) is generally like denim applications.

Example:

Stitch & Seam – 401 SSa-1
Length of seam – 42 inches or 1.17 yards
Fabric weight – Light weight
Estimated Thread Consumption = 1.17 yds. X 5.0 (Ratio) = 5.85 yds. / seam
5.85 yds/seam X 1.15 = 6.73 yds/seam including a 15% waste factor
Estimated needle thread = 6.73 X 40% = 2.69 yds
Estimated looper thread = 6.73 X 60% = 4.04 yds

Average Thread Consumption Totals by Garment

The following is a list of sewn products and thread consumption totals based on thread consumption reports conducted by our Technical Service Department. These thread consumption figures include a 25% waste factor and are based on a typical garment construction.

Product Sewn	Total Yds/Garment	Product Sewn	Total Yds/Garment
Men's		**Boy's**	
Slack	225	Jeans	168
Jean	200	Pants	183
Jean Short	160	Jacket	175
Work Pants	238	Dress Shirt	101
Suit Coat	175	Knit Shirt	83
Dress Shirt – long sleeve	131	Baseball Cap	44
Work Shirt	115		
Knit Polo Shirt	130		
Fleece Sweat Shirt	280		
Tee Shirt	63		
Tank Top	58		
Knit Brief	68		
Women's		**Girl's**	
Lined Coat	246	Blouse	73
Blazer	153	Dress	118
Dress	141	Swim Suit	65
Skirt	192		
Blouse	122		
Pants	162		
Jeans	250		
Shorts	151		
Robe	300		
Night Gown	135		
Panties	62		
Bra	63		

Estimating Thread Cost

The thread cost can be estimated by multiplying the thread consumed times the cost of thread in the same units. For example:

Men's Dress Shirt thread consumption with 25% waste factor = 131 yds.
Average Cost of T-24 Poly Wrapped Core Thread = $4.50 / 6000 yard cone.
Cost per yard = $4.50 ¸ 6000 = $.00075/yard
Calculation: 131 yds./shirt X $.00075/yard = $.09825/shirt