Downproof vs. Thread Count Comparison

Thread count is the most common metric for describing fabric. Typical thread counts for a cotton downproof-fabric range from 230 to 400 threads per square inch. Synthetic downproof-fabric thread counts can vary considerably.

Can Thread Count Predict Downproofness?

Thread count is sometimes used to predict a fabric's downproofness. IDFL data suggest there is **NO** correlation to justify this. Using IDFL data, the plot (below) shows the fairly loose correlation between thread count and downproofness (rotating box). The line represents the threshold of passing/failing downproof. As depicted by Chart 1, even fabrics with high thread count fail downproof testing.
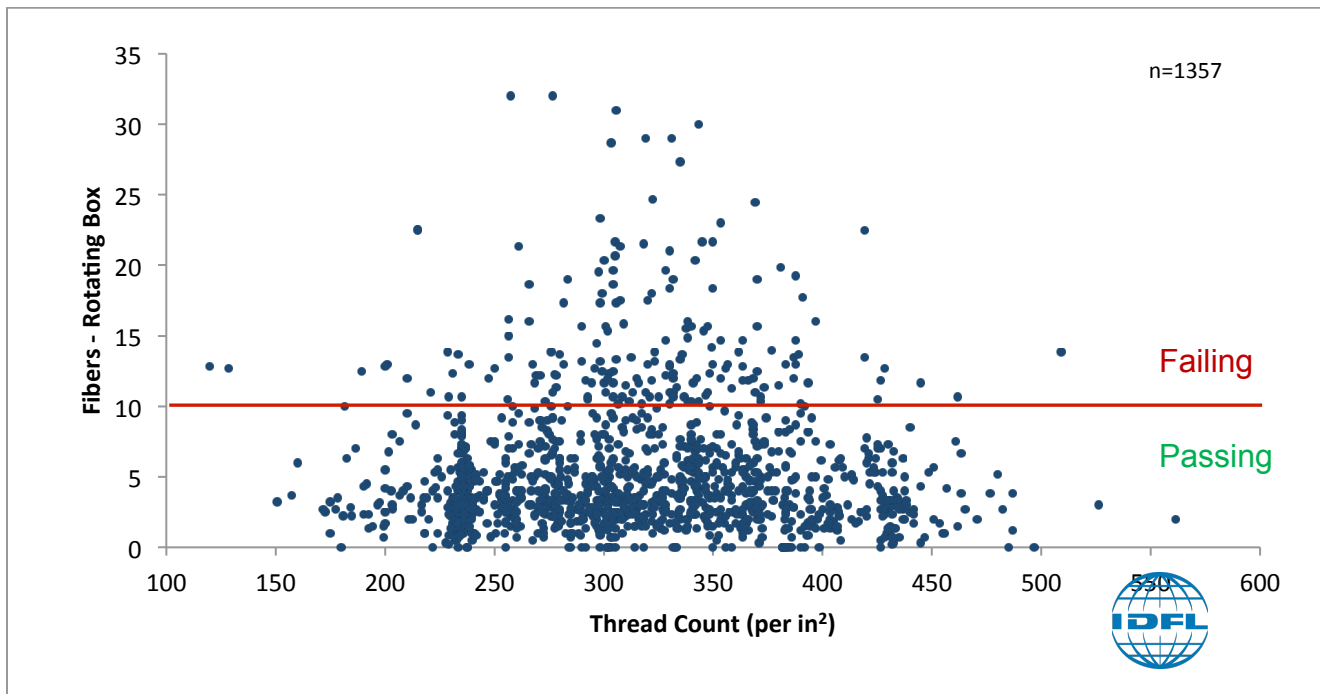

Chart 1. Plot shows passing and failing downproof fabrics with associating thread count. (Data was averaged to aid visualization)

In addition, to evaluate the correlation between downproofness and thread count, we use the **Pearson Correlation Coefficient (r) – see equation below. When there is a perfect correlation between downproofness and thread count, the coefficient downproof should be equal to 1 or -1. Using data from past IDFL samples, the coefficient was equal to 0.015.

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Also analyzed was the frequency of thread count values for failing downproof samples. For any sample that was failing downproof testing (e.g. result > 10 fibers) the corresponding thread count was identified. This was then charted on a histogram showing the frequency of thread counts for fabrics which failed downproof testing (see Chart 2).
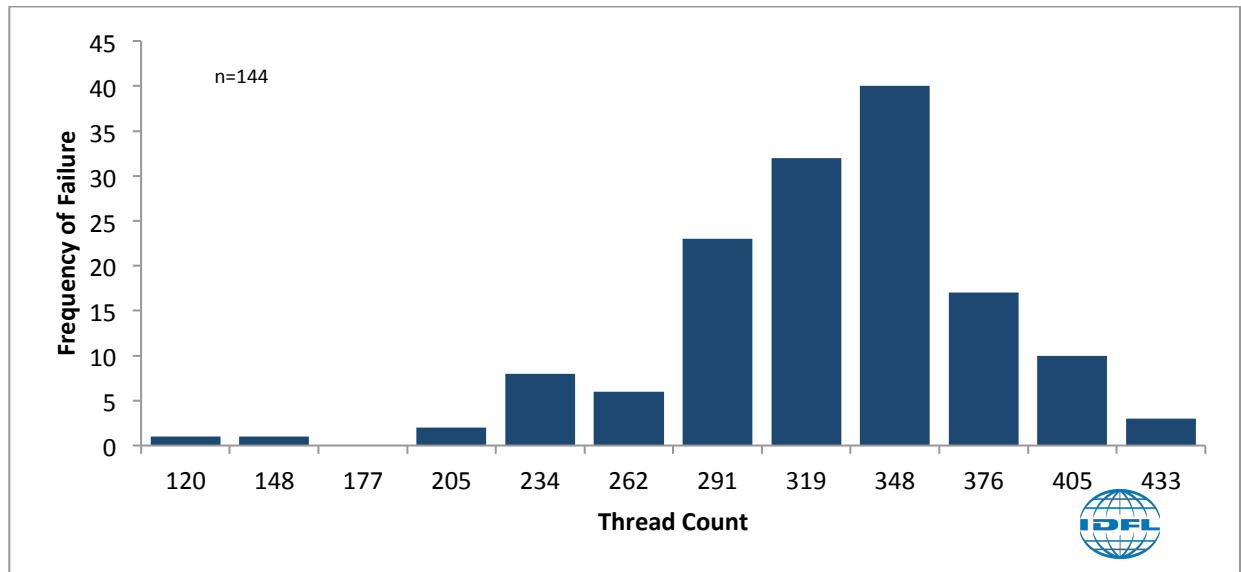

Chart 2. Histogram of thread counts of fabrics which failed downproof testing.

It seems counterintuitive that a fabric with such a high thread count can fail downproofness, but this shows that thread count isn't always a good predictor of downproofness.

Other Reasons for Lack of Correlation

Thread count, though certainly a factor of downproofness, is not a predictor of downproofness because there are many other factors that come into play. Some of these factors include:

1. Style of Weave
2. Fiber Content
3. Calendaring
4. Fabric Treatments
5. Stitching

6. Fabric Weight
7. Effects of Laundering
8. Yarn Size
9. Testing Product vs. Finished Product
10. Packing Methods

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Recommendation

Thread count is not a good predictor of downproofness. In order to assure the most accurate information, it is recommended to test both a fabric's downproofness and thread count.

Pearson Correlation Coefficient (r)

$$r = \frac{\sum_{i=1}^{n}(X_i - \overline{X})(Y_i - \overline{Y})}{(n-1)S_x S_y}$$

X_i = variable
$\overline{X}$ = Mean value of all X variables
Y_i = variable
$\overline{Y}$ = Mean value of all Y variables
S_x = Standard deviation of all X variables
S_y = Standard deviation of all Y variables