Fabric Density Measurement and Control

Finishing to fabric density results in predictable residual shrinkage . . .

. . . finishing to fabric weight yields unpredictable residual shrinkage . . .

. . . therefore, rely on course count, not weight!

How cotton and cotton-blend circular knit fabric is finished determines the amount and uniformity of lengthwise shrinkage.

Finishing fabric to a specific course count provides better lengthwise shrinkage results than finishing to a specific weight.

Automation Partners Inc.

Tubular Compaction Control

Finishing tubular fabric to weight (GSM) results in unpredictable residual length shrinkage.

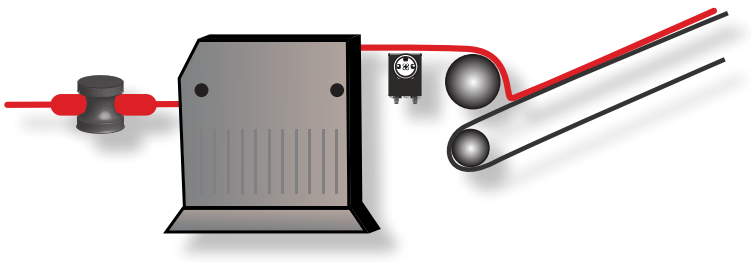
Finishing to course count (CPI) yields predictable residual length shrinkage.

An optical fabric density measuring sensor can provide the means to automatically control the compaction of a tubular compactor to achieve the desired course count.

An automatic compaction control system based on density measurement and control will:

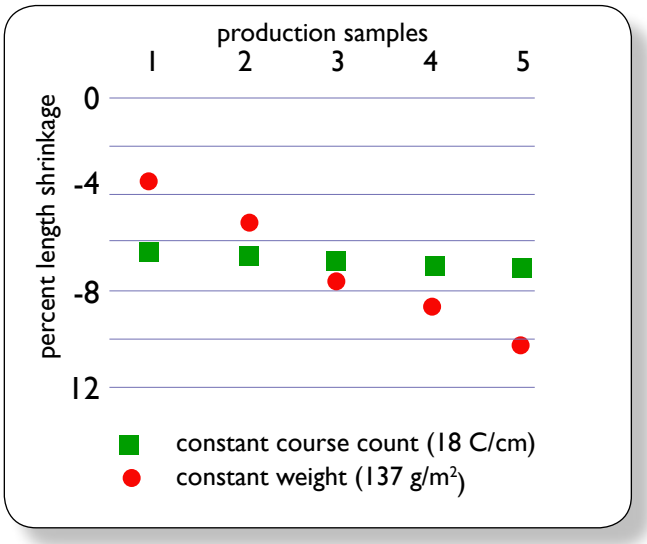
- Eliminate over- and under-weight fabric.
- Reduce or eliminate punch-weight measurements.
- Provide consistent results from all operators.
- Result in uniform fabric, seam-to-seam.
- Yield predictable residual shrinkage.

The Automation Partners Inc. CCS-300 Compaction Control System uses finished fabric density as the measurement and control parameter. An optional width measurement sensor can be added to the system to provide automatic control of fabric width, resulting in the highest quality fabric—finished correctly every time.



The Advantage of Fabric Density Measurement and Control

In a study by Cotton Technology International, five plain jersey fabrics were finished to constant weight and width, and five were finished to constant course count and width.



The results shown in the graph above:

- Fabric finished to constant weight (137g/m2) will have shrinkage that varies from -3.8% to -10.1% as yarn count varies. This 6.3% range is unacceptable to most customers.

- Fabric finished to constant course count (18 C/cm) will have shrinkage that only varies from -6.4% to -7.1%. This 0.7% range is preferred by customers—and attainable with CCS-300.

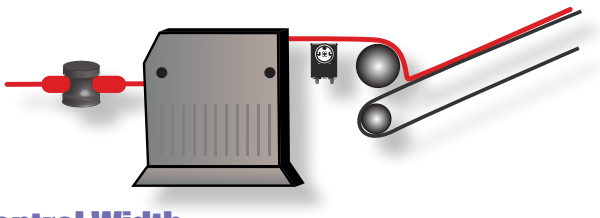
Compaction Control—How It Works

A PSM Sensor measures the courses of knitted fabric at the exit of the compactor.

The process controller/operator workstation compares the measured density to preset parameters and automatically adjusts the compaction to maintain a constant course count in the finished fabric.

The control parameters are selected by the compactor operator from a list of predefined style "recipes" on the operator workstation.

Control Density



Control Width

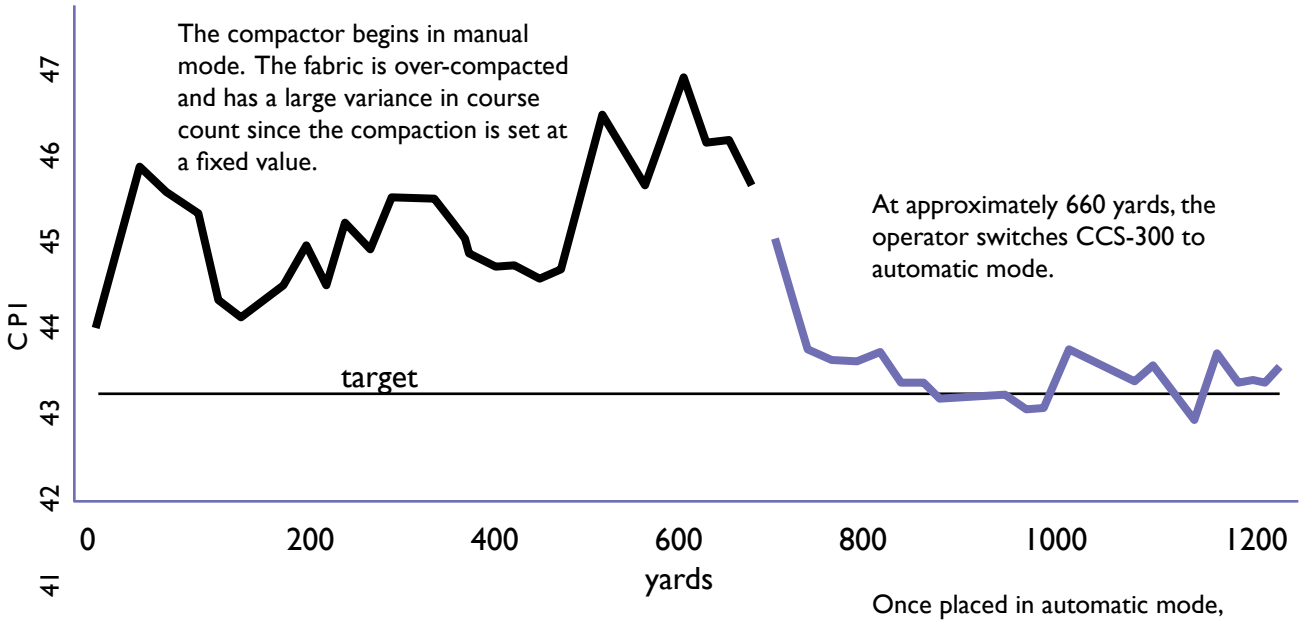
In addition, the system measures the relative speed between the main roll and the retard roll to monitor the percent compaction. This percentage is compared to adjustable maximum and minimum limits.

Automatic control is limited to these preset limits to prevent fabric and compactor damage caused by excessive compaction.

The Results are Clear

The chart below shows the benefits of using automatic control of a compactor over manual control. We started the compactor in manual mode, noted in black. At approximately 660 yards, we switched CCS-300 to automatic mode, shown in purple.

Clearly, CCS-300 provides uniform course counts, which gives finishers predictable shrinkage and eliminates overweight fabric.

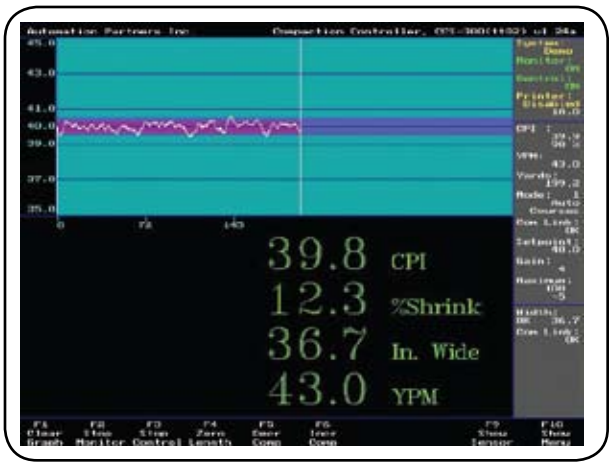


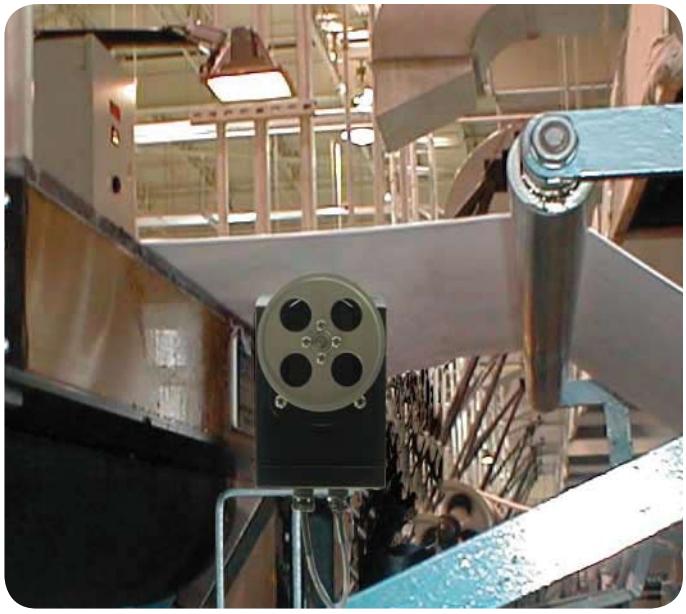
Once placed in automatic mode, the compaction was immediately reduced. CCS-300 adjusted the course count to the desired set point and maintained it through the entire process.

Optional Width Measurement and Control

Adding the optional width measurement device provides for the automatic control of finished fabric width.

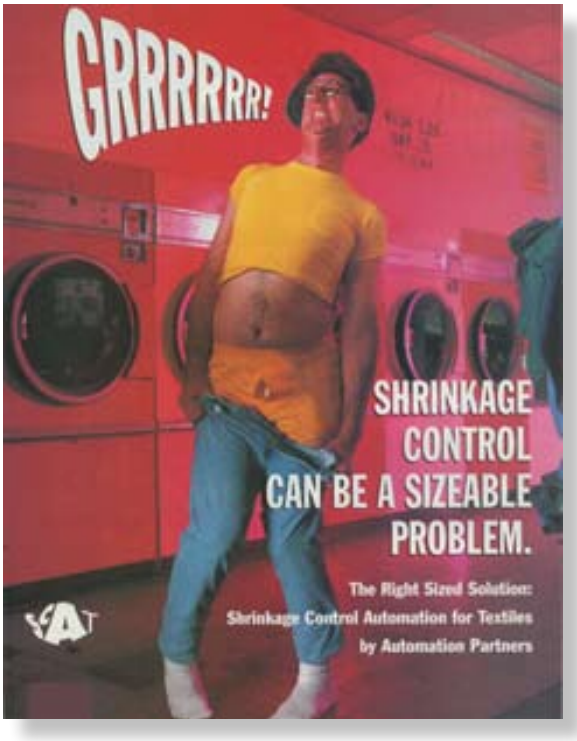
CCS-300 with this option results in the highest quality fabric—finished to the exact density and width per specification.





Optional fabric width measurement unit mounted with a PSM-200 Sensor under the fabric on a tubular compactor.

With CCS-300,
residual shrinkage
will no longer be a problem—
it will be your ***advantage.***



As stated in the article *Influence of the Spinner on the Shrinkage of Cotton Circular Knits* (Cotton Technology International, 1996), "The practical effect upon the shrinkage of a given fabric construction, of differences in yarn tex of ±3%, depends upon whether the finisher is attempting to deliver a constant length in the finished fabric, or whether he is attempting to deliver a constant weight per unit area."

The studies concluded that finishing fabric to a specific course count provides better lengthwise shrinkage results than finishing to a specific weight.

Buying a Tubular Compactor?

Ask your supplier to add course count measurement and control to your new machine. Many machine manufacturers already use the PSM-200 System and integrate it with their machine controls to provide an integrated package for fabric density measurement and control. Get the advantages of predictable shrinkage as soon as you get your new machine.

Specify the Automation Partners PSM-200 System to make certain you are getting the best.

Automation Partners Inc. has provided electronic solutions to the textile industry since 1990. With thousands of sensor systems and control systems installed worldwide, API is the market leader in this technology. You can count on this experience and performance to be assured of getting the best product—and the best service—at a fair price.

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