

# **Optimising fabric quality, finishing processes and machinery through the use of Fabric Objective Measurement**

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## SiroFAST-1

SiroFAST-1 introduced two innovations:

- Most thickness meters prior to the development of SiroFAST-1 were based on the movement of a plate which was brought in contact with the surface of the fabric. The movement of the rod to which this plate was attached was measured using an electrical device called an LVDT, through which the rod passed. By using a proximity meter to detect the position of a metal cup before and after the fabric was interposed between the cup and detector, a simpler measurement could be made without moving parts in the detector.
- A second innovation was the concept of 'surface thickness'. This is a measure of the compressibility of the fabric, which is an important measure of one aspect of fabric handle. The surface thickness is defined as the change in thickness in the fabric between the two applied loads, 0.195 kPa and 9.807 kPa. Later measurements using this instrument were also introduced to assess the pressing of the fabric during finishing and the stability of the flat press imparted.

## SiroFAST-2

SiroFAST-2 used an old concept of cantilever bending (which dates back to Pierce in 1930) to measure the bending rigidity of the fabric. The instrument measures bending length and from this calculates bending rigidity:

Bending Rigidity – weight per unit area \* (bending length)<sup>3</sup> \* Constant.

Although the concepts were old, the mechanisms used in the instrument were themselves innovative:

- The movement of the fabric as it was pushed over the 'edge' to form a cantilever was measured mechanically rather than using a ruler on the side of the earlier instrument (shown).
- The point at which the fabric crossed the plane of bending was measured using a photocell rather than by eye using mirrors. Measurement by eye was difficult and tiring for the operator.

## SiroFAST-3

The innovation in SiroFAST-3 lies in the simplicity of the use of a balanced beam to load the fabric and the use of a proximity meter to measure deformation

## SiroFAST-4

There were two innovative aspects to FAST-4:

- The first was the use of only measurements of the dimensions of the bone-dry and wet fabric to determine dimensional stability rather than the traditional use of the conditioned dimensions. As it requires hours for a fabric to condition in a standard atmosphere, the use of only the dimensions of the wet or dry fabric results in a considerable time-saving in conduct of the test.

$$\text{Relaxation shrinkage} = \frac{\text{Initial (dry)} - \text{Final (dry)}}{\text{Initial(dry)}} \times 100\%$$

- The second innovation was the use of a digitising tablet to mark the measurement points and calculate the changes in dimensions and, ultimately, the dimensional stability of the fabric.

## **PressTest**

PressTest determines the ease with which fabric can be pressed to form a good crease, flat seam or sharp pleat. It does this by measuring the angle adopted by a 180-degree fold pressed under standardised conditions and allowed to relax.

The innovative process behind PressTest lay in:

- recognition of the problem
- development of the standardised way of pressing fabric
- development of an instrument for measuring the effect achieved
- development of the background information required to correct the problem in fabrics before they were cut and sewn.

The adoption of PressTest improved the predictive power of the SiroFAST system and is now an integral part of the system.

## **Key to successful use of objective measurement technology**

The key to successful use of objective measurement technology lies not in the measurement, but the interpretation of the measurement made.

The value of the existing systems (KES-F and SiroFAST) lies in the application of the extensive published background information as well as that contained within the manuals of the systems. Access to information on the interpretation of data in the use of that information for improving quality will remain the main driver for the uptake of the KES-F and SiroFAST systems.