

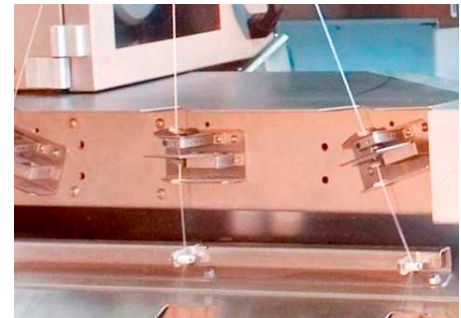
FibreTQS On-Line Monitoring BCF

FibreTQS is an advanced On-Line monitoring system that has been jointly developed for the BCF process by NEUMAG and OERLIKON Fibrevision. FibreTQS provides measurement of all key quality parameters, with simple operation resulting in real time confidence in yarn quality.

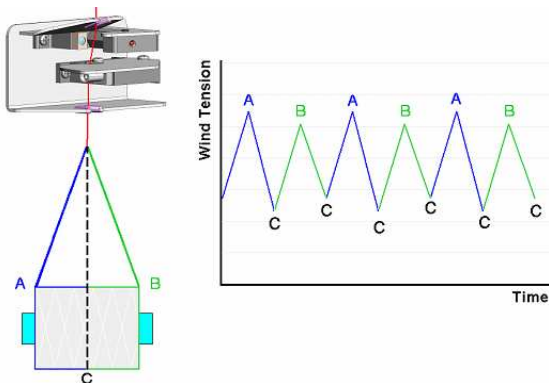
FibreTQS Sensors

The **FibreTQS** system monitors all aspects of BCF quality with a multi function sensor comprising; an advanced optical sensor and an ultra high frequency tension sensor, providing direct measurement of yarn quality, allowing easy interpretation by laboratory and operating staff. The key quality measurements are:

- Crimp Modulus
- Wind Tension
- Interlace Level (Entanglement)
- Broken Filaments and Slubs



Multi Function Sensor on S5 Machine



Crimp Modulus is a direct measurement of the bulk level of the yarn, one of the most important aspects of BCF Quality. The Crimp Modulus measurement is based upon sophisticated analysis of a high frequency measurement of the tension in the winding area of the BCF machine to identify the tension required to stretch the yarn during the traverse cycle.

As shown in the diagram, as the yarn is traversed across the package the tension increases from the centre of the package (point C) to the edges of the package (points A and B). With a highbulk yarn these tension differences are small; with a low bulk yarn they are large.

Winding tension

this affects package build quality, but is also an indication of yarn quality, especially if there are large variations between threadlines.

Interlace Level

is a vitally important aspect of the BCF process, in multi coloured yarns the interlace level has a major influence over the appearance of the yarn, and in all processes the air pressure selected has a major impact on the process costs. The INTERLACE measurement is based on a very high frequency analysis of the data from the optical sensor and provides data on both the mean level and variability of Interlace

Broken Filaments

and especially Slubs (large broken filament faults) have a major impact on the quality of the BCF yarn, but equally important they indicate process problems that can result in a high break rate with resultant efficiency loss. The BROKEN FILAMENT measurement is based on an ultra high frequency measurement of the data from the optical sensor and provides separate data on the number of Broken Filaments and Slubs per package.

Ease of Use

FibreTQS is optimised for ease of use with:

- LED indication of doffed Package Grade at the winder , allowing immediate segregation of faulty packages
- Immediate identification of faulty threadlines
- Simple Intuitive User Interface with Intelligent automatic setting of Grading Limits



FibreTQS Cost Benefits

FibreTQS monitoring provides users with substantial benefits in both Direct and Indirect Cost benefits:

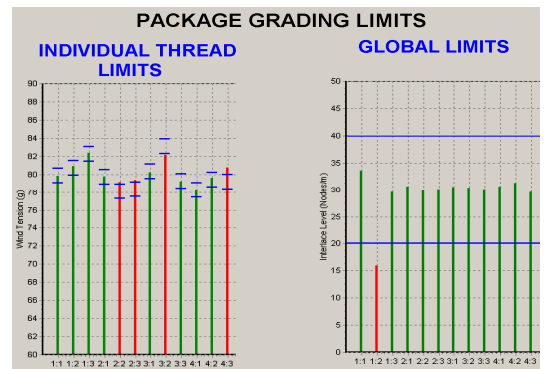
- Interlace Cost** **FibreTQS** allows reduction of the Interlace air pressure, by eliminating the requirement for an “insurance” margin. Savings over €1000 per Threadline can be achieved each year.
- Testing Cost** **FibreTQS** real time on machine testing eliminates the need for most of the laboratory testing; this provides substantial direct cost savings.
- Claim Reduction** **FibreTQS** reduces claims by preventing shipment of off quality packages and by providing detailed quality data for each package shipped.
- Better Efficiency** **FibreTQS** enables rapid optimisation of the processes by quickly highlighting process problems on any threadlines, allowing rectification action to be taken before efficiency loss.

Automatic Package Grading

Due to the high production rate and frequent merge changes, the BCF process has special requirements in the setup of package grading.

To address these requirements, Oerlikon Fibrevision and Oerlikon Neumag have developed an automatic grading system using package average data. This involves the key quality measurements being assessed against automatically generated **GLOBAL** and **INDIVIDUAL THREADLINE LIMITS**:

At each Merge (or Lot) change, the system automatically suggests both global and individual threadline limits. At the same time highlighting any threadlines that are outside “normal” values allowing the operator to quickly take necessary rectification action



Once the operator is satisfied that the process is stable for all threadlines he then accepts the suggested limits and grading is fully operational. The Quality Grade for each doffed pack is then indicated at the winder with LEDs allowing easy and immediate quality segregation by the machine operator.

FibreTQS Quality Benefits

The BCF process is complicated with many potential sources of faults, **FibreTQS** Grading has been developed to identify these faults helping prevent the associated downstream quality faults, The overall result is better quality 1st grade yarn, together with a lower percentage of 2nd quality and Reject yarn.

BCF Process Faults	Carpet Quality Faults
Incorrect Temperatures	Bulk Variation
Mistreading	Dye Shade Variation
Damaged / Faulty Texturing Jet	Carpet Faults
Damaged / Faulty Air Jets	Stripes in Carpet
Incorrect Winding Tensions	Stops in Tufting
	Low Tufting Efficiencies

Maintenance

FibreTQS minimises maintenance requirements with:

- Automatic Cleaning** Optical sensors are automatically cleaned with a jet of air during every doff cycle
- Automatic Calibration** Tension Sensors are automatically zeroed whenever yarn is not running on the sensor.
- Maintenance Alerts** Condition of all sensors is monitored continuously and a maintenance alert is raised in the event that attention is required.