FibreTQS

On-Line Monitoring

FibreTQS – ON-LINE MONITORING

FibreTQS screened yarns provide clear benefits in downstream processing enhancing the users reputation and cost effectiveness – a real guarantee of a profitable investment.

FibreTQS is a unique but fully commercial On-Line Monitoring system that incorporates a number of advanced and patented features to monitor a wide range of yarn properties: The highly developed sensors together with sophisticated real time signal analysis provide quality data not previously available by any other means.

FibreTQS provides total quality monitoring for all types of synthetic fibre processing equipment including; Spinning (POY, FDY, BCF, T&I) Draw Texturing (DTY) Air Texturing (ATY) as well as Cabling and Twisting.

FibreTQS - QUALITY BENEFITS

FibreTQS not only grades every package, but also provides extensive software tools to allow substantial improvement in the fundamental quality of the process by:

- Rapid Identification of repeating Faulty Threadlines
- Identification of positions drifting towards downgrade limits
- Identification of short term or cyclic faults that would not be seen in off line testing
- Identification of quality trends that allows maintenance to be more effectively planned
- Control of extreme positions reducing overall quality variation
- Immediate Identification of Misthreads

The result of this continuous monitoring with FibreTQS is substantial quality improvements with:

- Better quality 1st grade yarn, together with a lower percentage of 2nd quality and reject yarn.
- Substantial improvements in downstream processing, including:
  - Higher Process Speeds
  - Higher Efficiencies
  - Lower Break Rates
  - Lower Levels of Off Quality Events
  - Lower Levels of Off Quality

FibreTQS - OEM PARTNERS

Fibrevision now have agreements for the exclusive supply of On-Line Monitoring equipment for new machines with:

- Barmag for POY, FDY and T&I Spinning Machines
- Neumag for BCF Machines

The benefits to the customer of these partnerships are substantial as the full benefits of FibreTQS are realised through complete integration with the machine. These include:

- Optimisation of the sensors in the yarn path, providing simple operation with little or no additional guide wrap.
- Doff number synchronisation
- Full synchronisation of monitoring with winder threading and doffing.
- Integration with plant automation and package handling systems

FibreTQS - FEATURES

Simple Interface

A simple intuitive user interface with a mimic display of the machine provides the current status of the machine at a glance.

Simply clicking on a winder icon displays details of the current running values for each property and clicking on individual threadlines provides:

- Full statistics of current measurements
- Summary of measurements for the package to date
- Details of any off quality events that have occurred on the package
- Real Time View of the signal for each property
- Data analysis tools to aid troubleshooting
- Access to quality reports from previous packages produced on the position
- Access to historical trend data from the position

Flexible Reporting

A range of reports are available to summarise package quality and off quality events; by machine, merge group, winder, or threadline over a flexible time periods. Full shift reporting facilities are included

These reports summarise the number and weight of packages in each grade and allow lists of packages in selected grades to be printed.

When viewing these reports on screen it is possible to view / print details of:

- Off quality events for any selected package
- Package summary data for each property
- Trend data for each property for the duration of the package

Quality Grading

FibreTQS continuously monitors data from all measurements and grades packages in real time based on the limits and grading criteria defined in the Merge Setpoints. The key grading limits available in the merge setpoints are:

Mean Variation - the minimum, maximum and CV values for each monitored property. These limits can be tested against either 12 second mean data, or package average values

Transient Faults – the minimum and maximum levels for each monitored property, these limits are tested against each individual reading and in the case of a fault a graph of the event is captured.

Slubs and Broken Filaments – these are handled separately and the grading is based on the number of Slub events, and/or the total number of Broken Filaments per package

On the basis of the faults identified, FibreTQS automatically assigns a quality grade to the packages (Grade 1, 2, 3, 4 or reject) This quality grade is displayed at the machine PC and can be transmitted automatically to any automatic handling / packing system immediately when the package is doffed.

Quality Improvement Tools

To complement the package grading functionality, FibreTQS is equipped with a powerful range of process improvement tools.

Quality Alerts – this identifies threadlines with repeating faults/breaks or those approaching downgrade limits

Pack Values – provides distributions based upon package average data of a selected period, allowing extreme threadlines to be easily identified.

Extremes and Variation View – provides view of the distribution and extremes of current real time data.

Historical Data – allows property trends to be assessed to optimise maintenance cycles.

FibreTQS Optical Sensors Fitted to Barmag FDY Machine

FibreTQS - POY/FDY

Substantial Improvement in Downstream Performance

Sensors

For POY and FDY processes two FibreTQS sensors are normally fitted:

Optical Sensors are fitted in the winding area providing measurement of:

- Interlace
- Broken Filaments/Slubs
- Denier Variation and Denier Change

On new machines these sensors also replace the end break sensors

The sensor arrangement is optimised to provide both easy threading as well as little or no increase in guide wrap.

Spin Finish Sensors are ideally fitted immediately after the Finish Applicator tips for both POY and FDY, as this location provides optimum operation and no increase in guide contact. In situations where a lick roller is used in FDY the sensors are fitted as shown in the photograph. These sensors provide measurement of:

- Spin Finish Mean Level
- Spin Finish Variation and Transients

FibreTQS Oil Sensors on Barmag FDY Machine

Quality Benefits

FibreTQS monitoring ensures a better quality 1st grade yarn. The result is substantial improvements in downstream processing (DTY and Warping), including:

- Higher Process Speeds
- Higher Efficiencies
- Lower Break Rates
- Lower Levels of Off Quality Events
- Lower Levels of Off Quality

Cost Benefits

FibreTQS monitoring reduces operating costs by:

- Elimination of Routine Laboratory Testing
- Reduction of Claims as 100% of the Yarn is Monitored
- Allowing Immediate Product Release
- Optimising Maintenance Procedures
- Improving Process Performance
- Optimising Interlace Process

Key Quality faults quickly identified by FibreTQS in the POY extrusion processes include

Monitored Data	Typical Cause of Faults	Typical Result of Faults
Spin Finish Mean Level	o Damaged/ faulty Spin Finish Pump o Damaged/ faulty/ contaminated Applicator o Misthreading	o High Break Rate o Low Surge Speed o Broken Filaments
Spin Finish Short Term High CV + Transients	o Damaged/ faulty Spin Pump o Damaged/ faulty/ contaminated Applicator o Air Bubbles o Misthreading	o Transient Faults o High Break Rate o Low Surge Speed o Bulk Variation
Broken Filaments and Slubs	o Damaged Guides o Faulty Spinnerets o Poor Pack Wipes o Misthreading	o Transient Faults o End Breaks o Broken Filaments
Interlace Level	o Damaged / Faulty Air Jets o Contaminated Air Jets o Misthreading	o High Break Rate o Transient Faults
Denier Variation/Change	o Spin Finish Faults o Quench Faults o Missing Filaments	o Bulk Variation o Low Surge Speed o Denier Variation

FIBREVISION

FibreTQS - FOR T & I SPINNING MACHINES

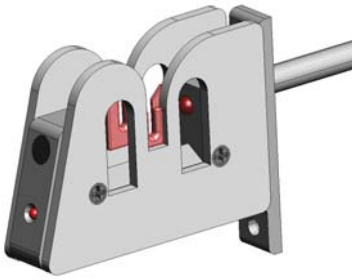
Excellent Correlation with Downstream Processes

Sensors

Optical Sensors are fitted in the winding area after the interlace jet to provide measurement of:

- Interlace
- Broken Filaments/Slubs

Spin Finish Sensors can be fitted immediately after the Finish Applicator to provide measurement of Spin Finish Mean Level and variation



T + I Optical Sensor

Quality Benefits

FibreTQS for the Technical and Industrial Yarn Spinning process offers substantial quality benefits to customers providing:

- excellent correlation with downstream performance due to:
  - The ability to differentiate between Slubs and Broken Filaments:
  - Accurate Measurement of Interlace Level and Distribution

Cost Benefits

In addition, FibreTQS reduces costs by:

- Elimination of Routine Testing
- Reduction of Off Quality Yarn by Immediate identification of faulty threadlines
- Reduction of Claims as 100% of yarn is monitored with a technique that correlates well with downstream performance
- Lower maintenance costs due to sensor durability and insensitivity to both contamination and waste / debris
- Optimising Maintenance Procedures
- Improving Process Performance

FibreTQS - FOR BCF MACHINES

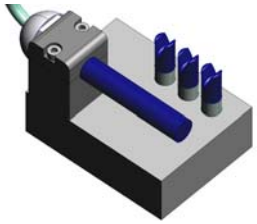
Immediate Automatic Grading of Every Package

Sensors

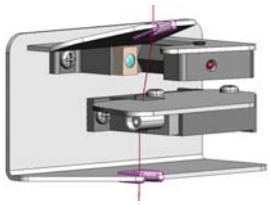
An integrated Optical / Modulus Sensor assembly is fitted in the winding area to provide measurement of:

- Winding Tension and Crimp Modulus
- Interlace
- Broken Filaments/Slubs
- Bulk Variation

Spin Finish Sensors can be fitted immediately after the Finish Applicator to provide measurement of Spin Finish Mean Level and variation



BCF Spin Finish Sensor



BCF Optical / Modulus Sensor

Quality Benefits

FibreTQS for the BCF process offers substantial quality benefits to customers providing:

- Immediate grading of packages for all key quality parameters.
- LEDs at each position indicating the quality grade of the yarn allowing direct graded packing from machine

Cost Benefits

In addition, FibreTQS reduces costs by:

- Elimination of routine testing
- Reduction of Off Quality yarn by Immediate identification of faulty threadlines
- Reduction of Claims as 100% of yarn is monitored with a technique that correlates well with downstream performance
- Optimising maintenance procedures

FibreTQS - FOR DTY MACHINES

Eliminates Requirement for Tension Monitoring

Sensors

In the DTY process a single FibreTQS sensor is used.

Optical Sensor provides measurement of:

- Interlace
- Broken Filaments/Slubs
- Bulk Variation
- Denier Change (Ply Detection)

This sensor also replaces the function of normal end break sensors on both new and retrofit installations.

The sensors are normally fitted in the take up area of the DTY machine in place of the standard end break detectors.

DTY Optical Sensor

Quality Benefits

FibreTQS monitoring ensures a better quality 1st grade yarn than obtained by using Tension Monitoring. This is achieved by:

- Direct measurement of yarn quality (bulk) - instead of an indirect measurement of quality (process tension)
- Monitoring a wider range of yarn characteristics – including Interlace, Broken Filaments and Slubs
- Monitoring at the end of the process – instead of only in the first zone

The result is substantial improvements in downstream processing and quality.

DTY FAULT RESPONSE
FibreTQS v Tension Monitoring

Fault Type	Tension	FibreTQS
Tension Transient	✓✓	✓✓
Tension Surging	✓✓	✓✓
Dye Shade Variation	✓	✓
Bulk Variation	✓	✓✓
Broken Filaments	X	✓✓✓
Interlace	X	✓✓✓

Cost Benefits

FibreTQS monitoring reduces operating costs by:

- Elimination of routine laboratory testing
- Reduction of Claims - a wider range of parameters are monitored on 100% of the yarn
- Allowing Immediate Product release
- Optimising Maintenance Procedures
- Optimising Interlace Process (allowing operation at a lower air pressure)
- Reduced maintenance costs (cf Tension Monitoring) due to:
  - No sensor calibration requirement
  - Vastly better sensor reliability

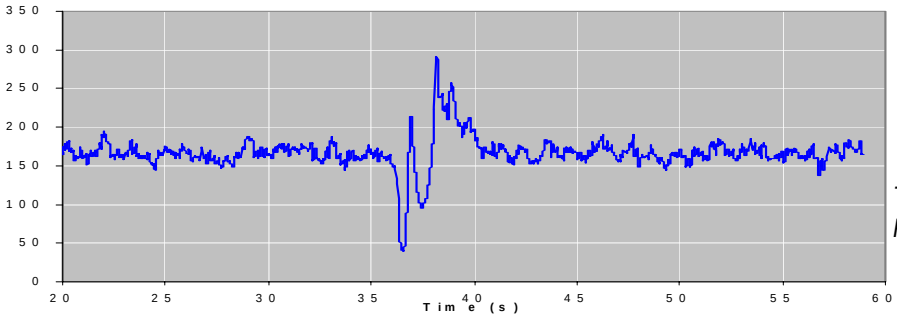
FibreTQS monitoring reduces capital costs by:

- Eliminating the requirement for end break sensors
- Eliminating the requirement for additional end break sensors when operating with plied yarns

Flexibility Benefits

FibreTQS monitoring on DTY increases process flexibility by:

- Allowing ply yarns to be added without additional end break sensors (due to the ply detection capability)
- Monitoring Fancy Yarn quality - allowing high value added products to be produced with confidence in the quality



Typical Bulk Transient Resulting from Tension Transient

FIBREVISION

FibreTQS - OTHER PROCESSES

In addition to the processes detailed in this brochure FibreTQS is also available for the following processes

Air Texturing

Full characterisation of ATY yarn quality using Optical sensors

Accurate Denier Change monitoring allows process to be run without additional end break sensors

Monofilament Spinning

Accurate Diameter Variation / Monitoring using Optical sensors - provides cost effective quality control.

Tire Cord Cabling

Direct Measurement of Twist and Twist Balance using Optical sensors - provides real benefits in yarn regularity and strength

Draw Twist / Draw Wind

Full measurement of Interlace, Broken Filaments and Slubs, especially valuable for Technical and Fancy yarn applications.

Accurate Denier Change allows plied yarns to be run without additional end break sensors

Elastomer Spinning

Diameter Variation and Filament Loss Monitoring with Optical sensors

Air Covering

Full characterisation of the entanglement of air covered yarns. Accurate Denier Monitoring allows breaks of any of the components to be identified.

FibreTQS - KEY OPTIONS

- Flexible Data Export to Plant System
- FibreMMC, (Multi Machine Controller) viewing, control and reporting of all configured machines from a single PC.

FibreTQS - TECHNICAL DATA

	Sensors		
	Optical	Spin Finish	Tension / Modulus
Range	20 to 1,500 denier 500 to 3500 denier	Up to 10,000 pS	0 to 500g
Measurements	Interlace, Broken Filaments /Slubs Denier/Bulk Variation , Denier Change ATY Quality, Twist / Twist Balance	Spin Finish mean level and variation	Tension Wind Tension Crimp Modulus
Principle	Optical profile measurement with patented signal processing	Conductance measurement with conversion to spin finish level.	Strain Gauge with ultra high frequency response
Calibration / Maintenance	Auto contamination compensation Maintenance alert if cleaning is required	Not required	Auto Zero Maintenance Alert if calibration required

SECTION INTERFACE UNITS	
Threadlines	Up to 12
Sensors	Up to 3 types per threadline
Inputs	Up to 14 user configurable Inputs
Outputs	Up to 14 user configurable Outputs
Power Supply	28v DC +/- 10%

COMMUNICATIONS GATEWAY	
LAN Length	Up to 80m per LAN
Sections	Up to 23 per LAN (2 LANs per Gateway) – Max 32 per machine
Inputs	Up to 2 user configurable Inputs
Outputs	Up to 2 user configurable Outputs

CUSTOMER SUPPLIED SERVICES	
PC	Minimum 2Ghz PC with 512mb RAM and 60Gb Disk with Windows 2000 Professional or XP Professional
Power Supply	24v DC ± 10% to each section
Doff Inputs	Input for to each to indicate Yarn Doffing / package building

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