FITNIR’s fully automated online and benchtop analyzers reliably measure complete liquor compositions to help pulp mills decrease process variability for improved efficiencies and profitability. Fast, frequent and accurate measurements drive process control strategies for optimization. With proven applications for digester, recausticizer, recovery boiler/dissolving tank, chlorine dioxide generator, brownstock washer, and wet and dry pulp kappa measurements, FITNIR is the next generation of process analyzers for pulp mills.
The simple power of NIR spectroscopy

The concept of near infrared (NIR) spectroscopy is based on the fact that molecules all have different light absorption and vibrational patterns. When NIR light is directed at the liquor sample, the sample’s molecules absorb light and energy and vibrate with a unique frequency, based on their molecular make-up. The spectrometer measures and records the unique spectral frequencies of the sample. The spectral features allow for simultaneous quantification of multiple liquor constituents. In an online system, this data is transferred to the mill’s DCS or, with a benchtop system, it is captured for historical reference. Simple in concept. Powerful in application.

CHALLENGES IN A DEMANDING ENVIRONMENT

Investment in today’s pulp and paper market is not an activity for the meek. Mounting global competition and climbing chemical, energy and raw material costs require nimble and innovative approaches and adoption of new technologies. Operations without the right measurement tools leave you guessing what is happening in your process and how to optimize it. The result? A significant impact on mill process variability, making it difficult to improve efficiency, streamline production and reduce chemical and energy costs to stay viable in this demanding environment.

FITNIR ANALYZERS: ELIMINATING THE MEASUREMENT GUESSWORK

Operators and control systems require accurate and reliable process chemical information to optimize strategic processes. FITNIR’s next generation process analyzers, developed by FPInnovations™, use Fourier-transform Near Infrared (FT-NIR) technology to measure key liquor and pulp properties throughout the mill. Our patented technology provides frequent measurements of liquor streams from the digester, recaustizer, recovery boiler/dissolving tank, chlorine dioxide generator, brownstock washer, and wet and dry pulp kappa.

FITNIR BENCHTOP

FITNIR Benchtop is a compact, plug and play pulp liquor analyzer providing fast and accurate measurement of a complete suite of key liquor properties. FITNIR Benchtop provides pulp mills with a cost-effective solution utilizing the same optically-based technology of FITNIR Online.

Main Features

- Heated vial holder
- Disposable vials for contamination-free operation
- No chemical reagents or dilution required
- Large patented pathlength for high accuracy and precision
- Measurements completed in seconds
- Samples can be taken from any location and tested immediately
- Printable reports and historical values

Key Benefits

- Low cost of ownership
- Provides a safe lab environment
- Eliminates errors associated with manual methodologies (i.e., pipetting and diluting)
- High repeatability and accuracy of measurements
- Shortens operators’ time in the lab by reducing test time
- Improved per sample cost due to quicker analyses
- Chemical cost savings
A complete solution for your pulp liquor measurement needs, FITNIR Online is a fully automated process analyzer capable of sampling from multiple sources and testing numerous components simultaneously.

**Main Features**
- Proven technology as a process analyzer
- Fully automated for frequent testing
- Large patented pathlength for high repeatability and accuracy
- Automated flushing of sample lines and cell with water to prevent scaling
- Sample scanning and measurements take only minutes
- Data transfer to mill’s PLC and DCS via Modbus and/or OPC
- Automated process and diagnostic alarms to ensure reliable operations
- Remote analysis via fibre-optic cable
- Little or no need for recalibration resulting in nearly 100% uptime
- No chemical requirements

Our customers have experienced many expected, and some unexpected, benefits from the FITNIR Online system. The integration of FITNIR Online allows mills to accurately and consistently determine what is happening in the various unit operations. We’ve eliminated the measurement guesswork so you can confidently control and optimize your mill processes.

**Key Benefits**
- Reduced variability in Green Liquor Total Titratable Alkali (TTA) and White Liquor Effective Alkali (EA)
- Increased Causticizing Efficiency (CE)
- Reduced purchased lime consumption
- Improved evaporator and recovery operations
- Increased production
- Savings in chemical and energy consumption
- Decreased operator safety risks

**A TRUE PLATFORM TECHNOLOGY**

Connected by fibre optic cables, one centralized spectrometer can handle up to eight remote field sampling stations and each station can typically accommodate up to six samples. A true platform technology, FITNIR Online enables expansion by installing additional field sampling stations for other process areas and even for future products and process streams. The advantage: a smaller spare parts inventory, reduced maintenance, and less training to maintain and operate.
**PROPERTIES MEASURED BY FITNIR ANALYZERS**

FITNIR Analyzers’ FT-NIR technology provides the most comprehensive and accurate suite of pulp liquor and solids properties measurements necessary for optimizing pulp mill processes.

**Digester – Black Liquor Properties**  
- Residual Effective Alkali (REA)  
- Solids: Inorganic, Organic and Total Solids*  
- Lignin  
- Density  

**Recausticizer – Green & White Liquor ABCs**  
- Effective Alkali (EA)  
- Active Alkali (AA)  
- Sodium Carbonate (Na₂CO₃)  
- Sodium Sulfide (Na₂S)  
- Causticizing Efficiency (CE)  
- Sodium Sulfate (Na₂SO₄)  
- Sodium Thiosulfate (Na₂S₂O₃)  
- Solids Content*  
- Polysulfides: Active, Inactive, Total, Residual Sulfide

**Recovery Boiler – Unclarified & Clarified Green Liquor**  
- Total Titratable Alkali (TTA)  
- Effective Alkali (EA)  
- Active Alkali (AA)  
- Sodium Sulfate (Na₂SO₄), Sodium Sulfide (Na₂S)  
- Sodium Thiosulfate (Na₂S₂O₃)  
- Sodium Carbonate (Na₂CO₃)  
- Reduction Efficiency (RE)

**ClO₂ Generator**  
- Acid and Chlorate Concentrations  
- Solids Content*

**Brownstock Washer**  
- COD/ClO₂ Demand

**Kappa Measurements**  
- Sack and Linerboard  
- Wet and Dry Pulp

*FITNIR Online measurement only

FITNIR SUPPORT

At FITNIR, we understand your business. Our expertise in both the lab and in the field goes into every aspect of our product development. Our innovations, process knowledge and dedication are focused on supporting your business success. We’re not just suppliers to our customers, we are partners.

SUPPORT SERVICES PROVIDED BY FITNIR

- Project coordination  
- Application engineering including kickoff meeting, system configuration, calibration and validation  
- System verification and testing  
- Application documentation  
- Initial and refresher training for mill personnel  
- After-sales support: remote system monitoring service via VPN connection, system auditing, configuration changes, routine and scheduled maintenance