Product sheet

DLT-5500

Dissolved Lignin Transmitter

FEATURES

- **In-line continuous measurement**
- **High accuracy of UV LED-based measurement**
- **Direct determination of dissolved lignin in pulp slurry**
- **Pre-calibrated with long term stability**
- **High installation flexibility – no flushing required**
- **State-of-the-art communication platform**

BENEFITS

- **Key parameter in fiberline operations control**
- **Improve brownstock washing**
- **Enhanced oxygen delignification and D_0 operations**
- **Reduce chemical costs**
- **Lower energy costs in evaporation plant**
- **Low start-up and installation cost**

GENERAL / BACKGROUND

The Dissolved Lignin Transmitter DLT-5500 is a sensor which measures the dissolved lignin concentration in pulp suspensions or filtrates using a unique principle based on optical measurement. The sensor is pre-calibrated and requires only one measurement onsite for the final calibration. The results can be correlated to either a filtrate kappa or chemical oxygen demand (COD).

This sensor is ideal for determining black liquor carry-over into bleach plants and black liquor solids in brownstock washing and oxygen delignification.

Traditional application rate of ClO_2 on the D_0 stage is determined by measuring the lignin content of washed fibers via a kappa analyzer or laboratory test. The ClO_2 is then applied based on the washed fiber kappa. While the lignin in the fiber consumes most of the ClO_2, the traditional washed fiber kappa does not account for the dissolved lignin that enters the D_0 stage from the brownstock washing area.

The lignin in the black liquor will rapidly consume the ClO_2 leaving insufficient ClO_2 to delignify the pulp. There are several other methods currently used to warn the operator of black liquor in the pulp.

Use QR-code or link for more information
www.btg.com/mybtg/en/instruments/dlt-5500

These methods however are an indirect indication of dissolved lignin in the pulp suspension and cannot quantify the dissolve lignin concentration. This results in an imprecise application of ClO_2 leading to either too little or too much ClO_2 added to the pulp. The DLT measures directly the dissolved lignin content.

Knowing the amount of dissolved lignin in the brownstock washing system can be used to optimize washing via a filtrate management control strategy. Selective installation of the DLT in one or more locations can provide real time quantifiable values of dissolved lignin.

By controlling wash water the brownstock washer operator can minimize black liquor carry-over in to the bleach plant (reduce ClO_2 application) and optimize total solids content going to the evaporation plant, thus reducing steam costs in the evaporation plant and maximize pulp production.

MEASURING PRINCIPLE / MEASUREMENT

The DLT-5500 is based on the light absorption of dissolved lignin in the UV-NIR range. Employing a unique principle (patent pending) the liquid portion of the pulp suspension can be characterized directly and the sensor can subsequently determine the concentration of dissolved lignin in-line in the presence of fibers even at medium consistency conditions.

A narrow light beam will occasionally pass through the relatively transparent fiber network without being affected by the fibers. Thus a measure of the liquid portion of the pulp is provided which can be used to determine the concentration of dissolved lignin irrespective of the fiber consistency. A complementary NIR channel can be used for pulp consistency measurement.

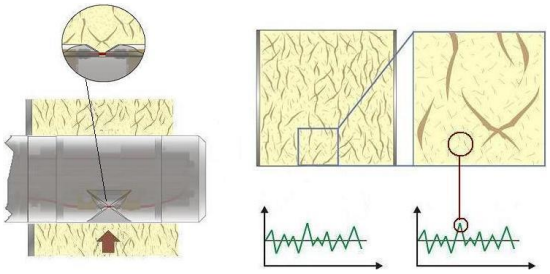

Figure 1: BTG's Peak Method

APPLICATION EXAMPLE

BROWNSTOCK WASHING OPTIMIZATION

The DLT-5500 can be used for measuring the dissolved lignin in pulp suspensions or filtrate in washing stages to optimize dilution factors.

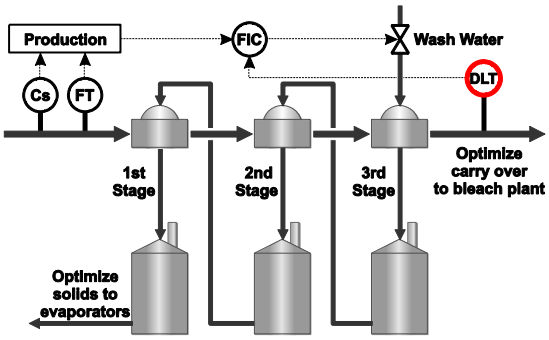

Figure 2: DLT-5500 Measuring dissolved lignin in brownstock washing

D_0 STAGE CONTROL

The DLT-5500 can be used for measuring the dissolved lignin content in the feed to bleach pulp suspension to provide the filtrate's contribution to the total bleach load, to optimize the use of chemicals for bleaching.

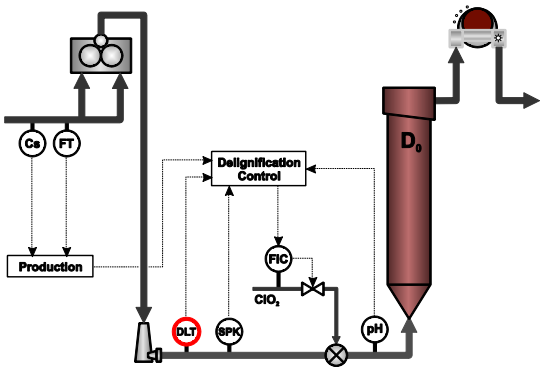

Figure 3: DLT-5500 measuring black liquor carry-over to bleach plant

TECHNICAL DATA / SPECIFICATIONS

GENERAL

Type	In-line smart optical transmitter for dissolved lignin and total consistency in pulp suspensions
Manufacturer	BTG Instruments AB, Säffle Sweden
Measuring range	Dissolved lignin corresponding to 0 – 3 A.U, lignin concentration range depends on configuration 0.01% – 3% total consistency Total consistency measuring range depends on pulp type
Repeatability	σ < 1% rel. at 1 A.U.

PROCESS SPECIFICATIONS

Process pressure	PN25 (25 bar at 20°C [362 psi at 68°F])
Media temperature	Max. 120°C [248°F] Min. 5°C [41°F]
Max. ambient temperature	Probe: 80°C [176°F] Electronics: 50°C [122°F]
Flow velocity	0.2 – 5 m/s for dissolved lignin 1.5 – 5 m/s for consistency
Consistency	0 – 12%, depending on pulp type
Process pH	2 – 14
Material:	
Wetted parts	SS, EN 1.4404, equiv. to ASTM 316L Titanium grade 2
Weld-in stud	SS, EN 1.4404, equiv. to ASTM 316L Titanium grade 2 254SMO Epoxi (Only for PN16)
Electronics box	Painted aluminum
Weight:	
Transmitter	Stainless steel: 3.4 Kg [7.5 lb] Titanium: 3.1 Kg [6.8 lb]
Sluice valve	Stainless steel: 4.0 Kg [8.8 lb] Titanium: 5.3 kg [9.9 lb]
Sensor electronics box	0.3 Kg [0.7 lb]
Communication Platform (CPM)	For information about the CPM, including input and output signals, see the CPM product sheet PS2026
Functions:	
Output signals	Signal 1 (Dissolved lignin): COD (mg/l, g/l), Absorbance (A.U.), Filtrate kappa (per ml) Signal 2: Total consistency (% or g/l)
Calibration sets	Four separate calibration sets, individually programmable, and externally controllable
Alarm function	Provides alarm signal on low and high consistency level, unstable signal
User interface	See Communication Platform (CPM)
Serial port	RS485
Mounting:	
Min pipe diameter	100 mm [4"]
Electrical connection	100 – 240 ±10% VAC, 50/60 Hz. Connected in CPM
Power consumption	Max 50 VA, a 2A slow blow fuse must be used

SAFETY & DIRECTIVES

Safety and protection class

Product safety	CE, C-tick, ETL
Protective rating	Equivalent to IP65, NEMA 4x

EU-directives

Designed in accordance with relevant CE standards.

Quality Assurance

Quality-assured in accordance with ISO 9001.

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Use QR-code or link for more information

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DIMENSION DRAWINGS

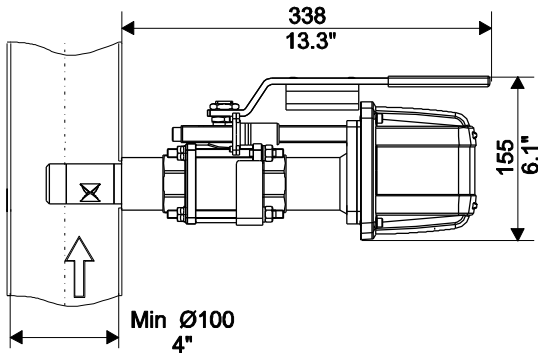

Figure 4: DLT-5500 Probe

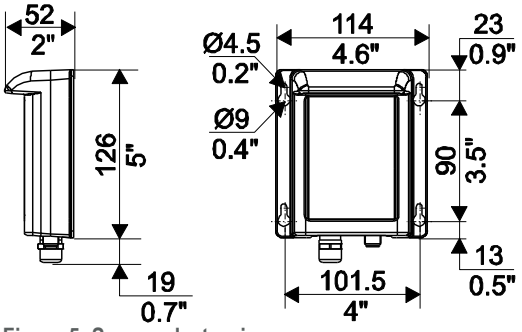

Figure 5: Sensor electronics