Pulping Liquor Analyzer

Configuration

The Pulping Liquor Analyzer consists of:

- Analyzer
  - Includes spectrometer, PC, monitor, keyboard, mouse, temperature controller for sampling cell enclosure, I/O modules, power supply, optional air-conditioner.
  - Complies with CSA
  - For general purpose environment
- Sample Handling System
  - Consists of sample routing panel, fiber-optic transmission cell, temperature-controlled cell enclosure, fiber-optic and electrical junction boxes.

Analyzer

- NEMA 12 cabinet 69.2 X 24.5 X 32.4 in. (175.8 X 62.1 X 82.4 cm) with forced air circulation (32-90° F, 0-30° C)
- NEMA 12 cabinet with optional air-conditioning (32-122° F, 0-50° C) to be used when the ambient temperature exceeds 86° F (30° C) or fluctuates by more than ± 9° F (±5° C)
- Analyzer weight 290 lbs. (132 kg.) plus an additional 140 lbs. (64 kg) for optional air conditioner
- FT-NIR covering the range from 0-15,000 cm^{-1}
- SMA-905 fiber-optic connections for 300 µm diameter fiber-optic cable
- Single fiber-optic output channel, expandable up to 8 output channels
- Single fiber-optic input channel, integrated room temperature InGaAs detector with variable-gain amplifier, expandable up to 8 input channels
- User-replaceable quartz-halogen light source
- Ethernet link to dedicated network interface card on PC
- 19-inch rack-mounted industrial PC
- 15-inch flat screen color monitor
- Pull-out drawer with keyboard and mouse
- CANbus I/O modules and power supply
- Optional Modbus, OPC over Ethernet, or VistaNET communications
- Temperature controller for sampling system cell enclosure for 300 µm diameter fiber-optic cable

Sample Handling System

- Sample handling system weight:1600 lbs (526 kgs)
- Construction Materials:
  - The sample handling system consists of a Unistrut frame which can be bolted to a concrete pad
  - Sunshade recommended (not supplied) for warmer climates
  - Any piping connected to the sample handling system must be in accordance with mill standards
  - Any pumps connected to the sample handling system must be in accordance with mill standards
  - Standard configuration: All wetted parts stainless steel, unless explicitly stated
  - Optional titanium configuration: All wetted metal parts titanium (in normal sample flow), unless explicitly stated
  - All seals Teflon® or Kalrez®, unless explicitly stated
  - Fiber-optic transmission cell windows constructed of material with excellent chemical resistance
- Fiber-Optic Transmission Cell Enclosure:
  - Temperature-controlled, insulated,NEMA 4X enclosure, controlled to 70.0±1.0° C (160.0±2.0° F), with see-through internal door
  - Fiber-optic, stainless steel (optionally titanium), near-infrared transmission cell with 8.0 mm pathlength
  - Membrane air dryer for continuous purge of fiber-optic transmission cell optics

- Fiber-Optic Junction Box:
  - NEMA 4X enclosure
  - 2” conduit (supplied by customer) connects to analyzer cabinet in general purpose environment contain 2 fiber-optic cables, plus 1 or 2 recommended spares
  - Two stainless steel over-braided Teflon™ hoses connect fiber-optic junction box to transmission cell inside cell enclosure, each contain 1 fiber

Sample Requirements

- Flow rate: 1 – 5 Gal/min (4.0 to 20.0 L/min)
- Sample temperature 120 - 350° F (50 - 175° C)

I/O Format

- CANopen
  - Digital input (typically 24 VDC)
  - Digital output (typically 115 VAC)
  - Analog input and output (typically 4-20 mA)
- Modbus
  - RS232 serial link (RS422/485 optional)
  - Modbus register address pattern: RTU protocol/Slave
  - Baud rate: default 19200 baud (configurable from 110 to 115200 baud)
- OPC
  - Ethernet link
  - Based on Microsoft’s COM technology
- VistaNET
  - Ethernet link based LocalArea Network for ABB process analyzers

Utilities and Services

- Analyzer
  - Power requirements for spectrometer, PC, and I/O modules: 115 VAC, 6 A, 12 AWG with ground
  - Power requirements for optional air conditioner: 115 VAC, 12 A, 12 AWG with ground
  - Operating temperature: 0 – 30° C
  - Humidity: up to 95% non-condensing
  - Fiber-optic cables:
    - Maximum length (one-way): 1000 feet (300 meters)
    - Minimum bend radius: 8 inches (18 cm)
    - Rigid conduit protection
  - Communication access: independent analog phone line or Internet network connection for remote access to computer with modem for validation and service support
- Sample Handling System
  - Power requirements for sample system heater: 115 VAC, 10 A, 10 AWG with ground
  - Instrument air for membrane air dryer, clean oil-free, -20° C dew point, 85 psi, 0.175 scfm, Swagelok
  - Power requirements for sample system heater: 115 VAC, 10 A, 10 AWG with ground

Overall Dimension

		w	D	H
Enclosure	(in)	24.5	32.4	69.2
	(cm)	621	824	1758
Enc. w/ AC	(in)	24.5	32.4	80.0
	(cm)	621	824	2013
Sample	(in)	48-60	25	75
System	(cm)	1219-1524	635	1905

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Performance

- Spectrometer technique: Fourier Transform Near Infrared
- Resolution: 16 cm^{-1}
- Spectral range for measurement: 4,000 cm^{-1} to 14,000 cm^{-1}
- Scan rate: 100 scans/min
- Measurement frequency: ≈ 5 minutes, varies by application
- Sampling: sample, settle, scan
- Range of analysis:
  - 4 – 120 g/L EA
  - 4 – 80 g/L Carbonate
  - 5 – 40 g/L Sulphidity
- Typical Precision:
  - 0.8% full-scale
- Typical Accuracy:
  - 1.0% full-scale

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