

VISCOMAT II

AUTOMATED PULP VISCOSITY ANALYSIS



- Semi-automatic determination of the viscosity of pulp according to ISO 5351 and SCAN-CM 15
- Automatic measurement, calculation and display of data
- Gain 5 min / analysis compared to manual analysis
- Reduce operator influence
- 3 measurements simultaneously
- PC controlled operation
- High Accuracy, Repeatability and Reproducibility ($< \pm 2.0\%$)
- Reduce risk of exposure to CED



The viscosity of pulp in cupriethylenediamine (CED) solution gives an average degree of the polymerisation of the cellulose and a relative indication of the degree of degradation resulting from the pulping/bleaching process. Determination of the viscosity of pulp is therefore an important routine analysis at most process labs in order to control the bleaching process.

Manual determination of viscosity is made by measuring the efflux time of the pulp/CED solution through a capillary tube by using a stopwatch. This procedure is very time consuming and highly inaccurate due to operator influence.

Viscomat II strongly improves method repeatability and reproducibility by providing automation of the measurement of flow times and the subsequent calculation and display of results. Data are displayed on screen with custom set alarms and can further be archived or transferred to LIMS system. The

semi-automation strongly reduces operator influence and the time gain is high compared to manual analysis. The system is designed according to and strictly follows the standard test methods ISO 5351 and SCAN-CM 15.

Viscomat II is easy to install and service requirements are minimal. The design is highly robust and the system has been on the market for more than 25 years.



ViscLab | Version: 2.12.0 | Lab: Lagge | CED-factor: 1

File Tools Settings Help

Work Data Results Archive

ID	Time	Weight	DryNess	RefVisc	Visc	SampleId	Viscometer	EffluentTime	CalConstant	TimeWeight	ManualChar	TimeChange
1	2010-03-25	353	99,7	3,64	231		1	36,899	1014	2010-03-25	0	
2	2010-03-25	267	99,7	3,73	312		2	38,035	1019	2010-03-25	0	
3	2010-03-25	290	99,7	3,87	297		3	39,251	1015	2010-03-25	0	
4	2010-03-25	290	99,7	0	0		0	0	0	2010-03-25	0	
5	2010-03-25	145	99,7	0	0		0	0	0	2010-03-25	0	
6	2010-03-25	151	99,7	0	0		0	0	0	2010-03-25	0	
7	2010-03-25	387	99,7	0	0		0	0	0	2010-03-25	0	
8	2010-03-25	0	99,7	0	0		0	0	0	2010-03-25	0	
9	2010-03-25	0	99,7	0	0		0	0	0	2010-03-25	0	
10	2010-03-25	0	99,7	0	0		0	0	0	2010-03-25	0	
11	2010-03-25	0	99,7	0	0		0	0	0	2010-03-25	0	

Register Weights Measure Approve Edit Delete

Dryness (%): 99,7 Apply

User: Default Change...

Sort by: SampleNo

Balance: Viscomat:

Access archive etc.

Analysis workflow

Change default dryness & apply to selected samples

Colors show sample status

Manual edit of samples

Status balance & Viscomat

PRINCIPLE OF OPERATION

The Viscomat consists of three separate viscometers, each furnished with two platinum electrodes for automatic measurement of the efflux time. Each viscometer is connected to vacuum via a high quality control valve.

The generic workflow of a viscosity analysis, as specified in ISO 5351, is outlined below.

SAMPLE PREPARATION

- Determine weight of sample. The weight is automatically transferred from the balance to the VisLab software. If the weighing is made on a balance not connected to the software, the weight can be manually entered into the software
- Determine the dryness (%) of the sample and enter into the software
- Sample is dissolved in water and cupriethylenediamine (CED)

LOADING OF SAMPLE

- The sample is drawn into the capillary viscometer of the Viscomat using the vacuum valve

MEASUREMENT

- The measurement is initiated by turning the valve to measurement position
- The efflux time is measured when the liquid level passes the top electrode and terminates when the level pass the lower electrode (resolution < 1 ms)



CALCULATION AND DISPLAY OF RESULTS

- The viscosity ratio and the intrinsic viscosity η are automatically calculated with five digit accuracy and displayed in the software

$$\log[\eta] = \log \frac{\eta - \eta_0}{\eta_0 \times c} - k[\eta]c$$
- The data obtained is automatically compared to adjustable alarm limits for viscosity ratio and intrinsic viscosity and the results are immediately displayed with stoplight colors (green, yellow, red)
- All results are stored in a database for archiving, export, printing and further analysis
- The software is prepared for export of results data to a LIMS system

Assign samples to tubes

Samples ready for viscosity analysis

ID #	Sample ID	Weight (mg)
1		353
2		267
3		290
4		145
5		151
6		387
7		380
8		407

Behavior of sample table

Include samples with Viscosity
 Hide loaded samples

Tube #:	1	2	3
ID #:	1	2	3
Weight (mg):	353	267	290
Remove	Remove	Remove	Remove
Effluent Time (s):	28.679	72.672	10.817
Rel. Viscosity:	2.87	7.27	1.08
Viscosity:	190	542	14

Manual save or autosave

Auto Save
 Only if no Alarm

Assigned samples

Status of the viscometers

Instant display of results with custom alarms

SPECIFICATIONS

FUNCTIONAL AND PHYSICAL

- Three individually operated temperature controlled viscometers
- All parts in contact with the sample are glass or platinum, for high chemical resistance. All parts and components are selected for reliability and serviceability
- All parts in contact with cooling water selected for minimal corrosion
- Built-in water circulation pump
- Two 12 mm ID tube connections to water bath (25°C)
- One 8 mm ID tube connection to vacuum source
- Computer with Microsoft Windows
- VisLab 2 software
- Serial (RS-232) interface to analytical balance
- USB interface to the Viscomat
- Dimensions: 400 × 300 × 567 mm (15¾ × 11¾ × 22¾ inches) W × D × H
- Weight: Approximately 16 kg (35 lbs)

INSTALLATION REQUIREMENTS

- Ambient Temperature: 0 - 35°C (32 - 95°F)
- Operating Humidity: 20 - 95% (non-condensing)
- Power supply: Single phase 220/110 V AC 50/60 Hz
- Connection to a temperature controlled water bath at 25 ± 0.1°C (77 ± 0.2°F)
- Vacuum for drawing samples into viscometers
- For more details, please request a separate Site Preparation Guide

ADDITIONAL EQUIPMENT

We supply a range of required additional equipment for a complete viscosity analysis using the Viscomat, e.g.:

- Balance
- Water bath
- Vacuum source
- CED solution

Please contact us or visit www.lagge.se for more details.



Alarm Limits

	Alarm 2:	Rel. Viscosity	Viscosity
Upper		10	1700
	Alarm 1:	10	1600
Lower	Alarm 1:	6	300
	Alarm 2:	6	250

OK Cancel

ViscH2	ViscH1	ViscL1	ViscL2	CtrlH2	CtrlH1	CtrlL1	CtrlL2	ChangeDate	User
1700	1600	300	250	9999	9998	2	1	2010-04-21 15:50:10	Default

Create Sample(s)

ID: 23
 Time: 2010-04-21 15:48:50 :00:00
 Sample ID: Boiler 2C
 Weight (mg):
 Dryness (%): 97
 Next ID automatically (using Balance)

Sample added:
 ID: 22
 Sample ID: Boiler 2B
 Weight: 267

Next OK Close

Internal Calibration

Tube #: 1 2

New Calibration: 1001 1031 972
 Current Calibration: 827 991 1129

Save