MICRO TSCM
On-line Streaming Current Meter (SCM)

Steaming Current (SC) for coagulant dosage

A streaming current (SC) meter is an instrument for measuring the charge that exists on small, suspended particles in liquid. A streaming current meter (SCM) is the only online instrument that can be used to measure coagulated particle stability for the feedback control of coagulant dosage. The streaming current monitor is a charge measuring device. The charge measured is the net ionic and colloidal surface charge (positive and negative) in the sample being tested. SC is related to Zeta potential, which is a measure of electrophoretic mobility in (mV).

Micro TSCM Analyzer

Micro TSCM Sensor/Sampler
with light shield removed

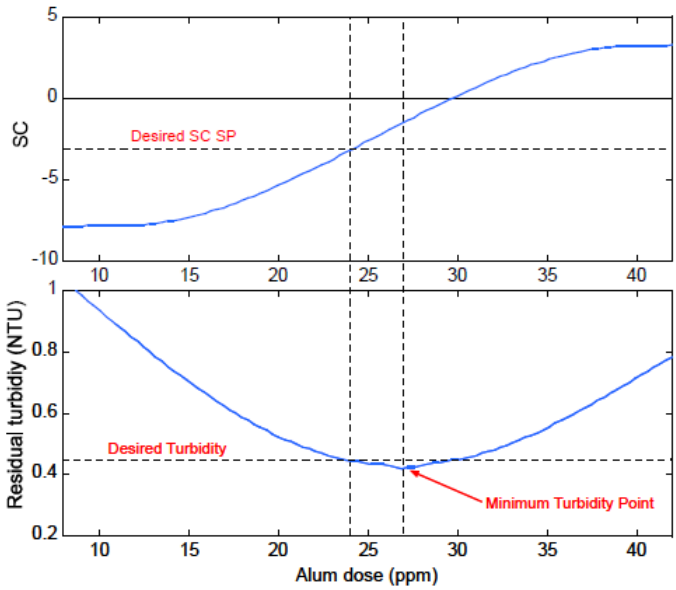

Diagram: Turbidity Residual as a Function of Streaming Current

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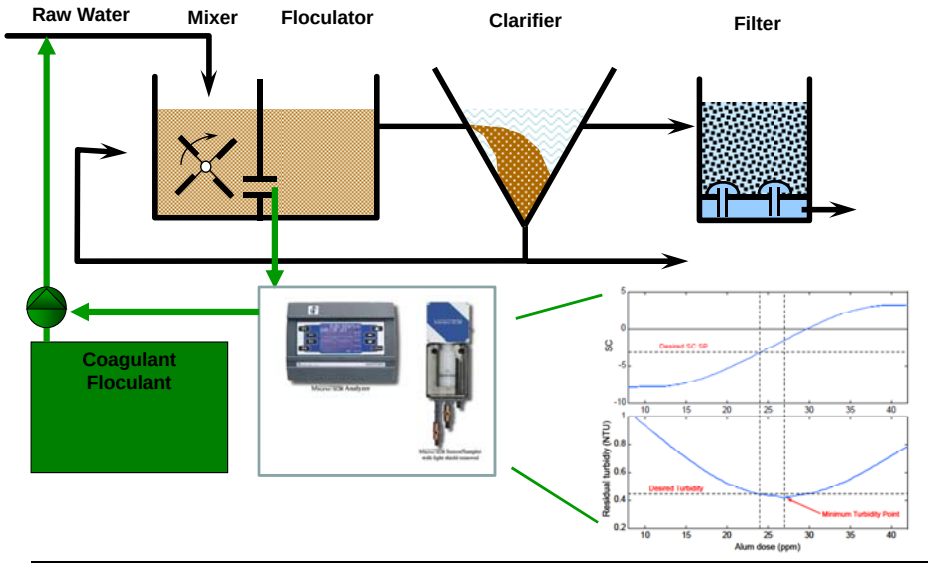
Specification

Ranges:	± 10 SCU (Streaming Current Units)
Method:	Ion Charge Analysis through induced electrical potential
Accuracy:	± 1% of full scale
Repeatability:	1%
Resolution:	0.01 ICu (SCU)
Display:	Graphical trending and LCD numeric
Clock Graphics:	Date and Time
Response Time:	1 second
Averaging Time (Electronic):	1, 15, 30 & 60 seconds, sliding average
Microprocessor:	Motorola MC68HC11
Keyboard data entry system:	8 interacting membrane switches with tactile feedback
Built in diagnostics:	Yes
Analog Output, Isolated:	4 - 20 mA, 0 - 10 VDC
Computer Interface Serial Port:	Option - RS-232 & RS-485 (optional)
Alarms:	1 System alarm, 2 User settable Hi/Lo/Off), 1 Flow Alarm (requires optional hardware)
Alarm Contact rating:	Max. 250 VAC @ 5.0 A
Operating Temperature:	32° - 122°F (0 - 50°C)
Flow rate:	Up to 10 G/min
Positive System Pressure:	60 psi maximum
Wetted surfaces:	HDPE, PTFE, Stainless Steel, Neoprene, ABS
Standard Cable Length:	25 feet (7.62 meters)
Analyzer Case:	IP 65
Sensor Case:	NEMA 4X
Supply Voltage:	120/240 VAC + 10% 50/60 Hz
Power Consumption:	40 VA
Shipping Weight:	Approximately 15 lbs. (6.8 kg.)

Streaming Current Application



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Theory

Turbidity is caused by suspended particles in water in the size range of approximately 0.01 to 100 um in size. The larger fraction can easily be removed by settling. The smaller particles, with sizes of less than 5 um are referred to as colloidal particles (or colloids) and have extremely slow settling velocities and so cannot be practically removed by settling. The behaviour of colloidal particles in water is strongly influenced by their electrostatic charge. This colloidal charge comes about because of the uneven surface characteristics of the particles and in most solids is negative, particularly the alumino-silicate clays typically suspended in surface water. The charge on each particle will repel others and prevent significant flocculation from occurring. Neutralising this charge is the main purpose of coagulation.

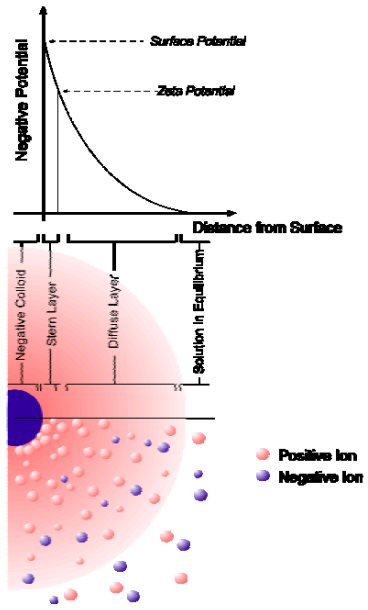

Fig: Double Layer Model

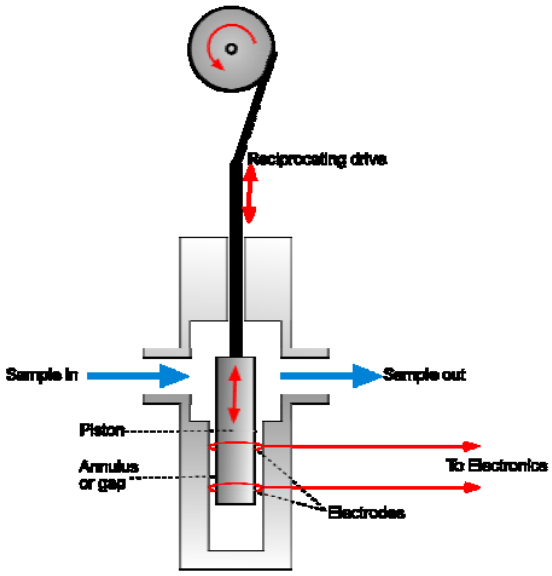

Fig: SC Analysel

Formula for Streaming Current: $I = k.s.\omega.\varepsilon.\zeta.f(r,R)$
(SC is related to Zeta Potential)

I=average current magnitude
s=piston stroke length
ω=motor cycles per second
ε=dielectric constant of solution
ζ=zeta potential (milivolts)
r= piston radius
R=chamber radius
k=electronics gain constant
f()=a function of the annulus shape

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