Viscotek™

Viscometer Detector

Viscotek's patented four capillary viscometer is an absolute detector which measures the intrinsic viscosity of a molecule in solution.

Intrinsic viscosity can best be explained by its relationship to molecular size and molecular weight: The size (or hydrodynamic volume) of a molecule in solution is equal to the intrinsic viscosity times the molecular weight.

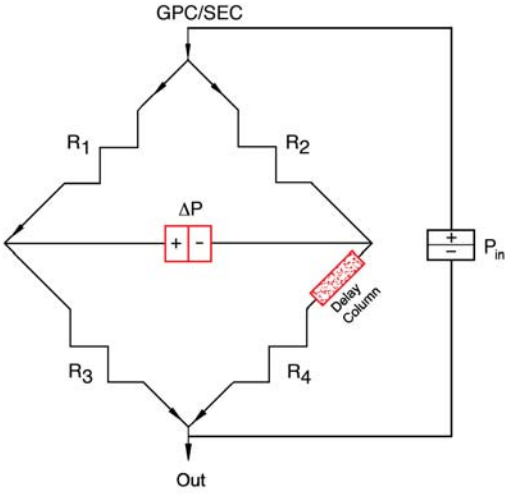
The Viscometer detector is used world-wide for characterization of natural and synthetic polymers, biopolymers, proteins, conjugates and nanomaterials.

In triple detection, the light scattering detector measures the molecular weight and the viscometer measures the intrinsic viscosity. This allows the determination of size distributions to less than 1 nm. In fact, triple detection is the only technique which can make these measurements under normal chromatographic conditions.

for more information visit us @ www.viscotek.com

Setting the Standard for GPC

Viscotek is the leading provider of comprehensive GPC/SEC solutions, featuring multiple detection for the characterization of natural and synthetic polymers and proteins. Viscotek's innovative products and technologies are backed by expert-level technical service and analytical support.



www.viscotek.com

Viscometer Operation

R_1, R_2, R_3, and R_4 are the four capillaries where R_1 and R_3 are parallel to R_2 and R_4. It is assumed that all the capillaries possess the same amount of resistance ($R_1 = R_2 = R_3 = R_4$). A delay column is installed between R_2 and R_4 capillaries. When the pure solvent with the viscosity of η_o is flowing through all four capillaries, the differential pressure recorded, ΔP, would be zero. Then as the polymer solution flows through the bridge, the resistance in the capillaries R_1, R_2 and R_3 will increase (this value is proportional to η), while the pure solvent continues to flow through the last capillary, R_4, due to the holdup by the delay column. Therefore the differential pressure will no longer be zero and will increase proportionally to the specific viscosity of the solution:

$$\eta_{sp} = \frac{\eta - \eta_o}{\eta_o} = \frac{4\Delta P}{P_{in} - 2\Delta P}$$

where P_{in} is the inlet pressure and ΔP is the differential pressure recorded. Since a very dilute solution is employed, it can be assumed that the concentration of the polymer solution is very close to zero. Therefore at infinite dilution intrinsic viscosity is determined. Specific viscosity is divided by concentration to produce Intrinsic Viscosity. This technique provides a very precise number in comparison with the absolute value.

Technical Specifications

Dimensions, Weight and Power

Width: 7.7 in. (19.6 cm)
Height: 9.7 in. (24.7 cm)
Depth: 18.3 in. (46.5 cm)
Total Instrument Weight: 21.6 lbs.
Power Supply: 100–240 VAC, 50–60 Hz, single phase
Fuse: 0.8 A, 250 VAC, type T

Viscometer Detector

Patented 4 capillary, differential Wheatstone bridge configuration.

Bridge Volume: 72 microliters
Maximum Flow Rate: 1.5 ml/min (H_2O); 3.0 ml/min (THF)
DP Noise Maximum: 0.7 millivolts
DP Noise Typical: < 0.5 millivolts
DP Drift Typical: < 3.0 millivolts/hour
Sensitivity: 2.0 x 10–5 specific viscosity
Transducer Linearity: < 1%
Shear Rate: 3000 sec–1

Viscotek World Headquarters
15600 West Hardy Road, Houston, Texas 77060, USA
Tel: 281-445-5966 or 800-375-5966 • email: info@viscotek.com

Viscotek Europe Ltd.
20 Wellington Business Park, Crowthorne, Berkshire RG45 6LS, UK
UK +44 1344 467180 • D +49 7254 959195 • BNL +31 412 639963
F +33 4 78 51 67 08 • email: info@viscotek-europe.com