



### Detectors

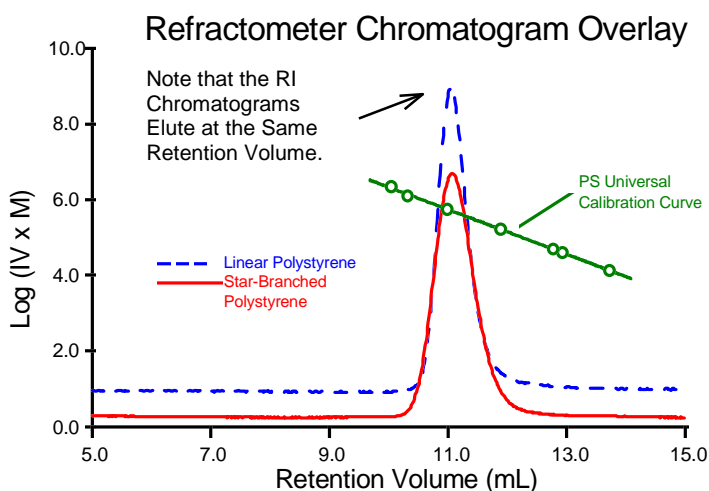
Viscotek Laser Refractometer  
Viscotek Differential Viscometer

The Universal Calibration Principle calibrates GPC columns as a direct function of molecular size. Molecular size is proportional to the product of intrinsic viscosity and molecular weight. With the use of the Viscotek differential viscometer, intrinsic viscosity can be obtained at every elution slice.

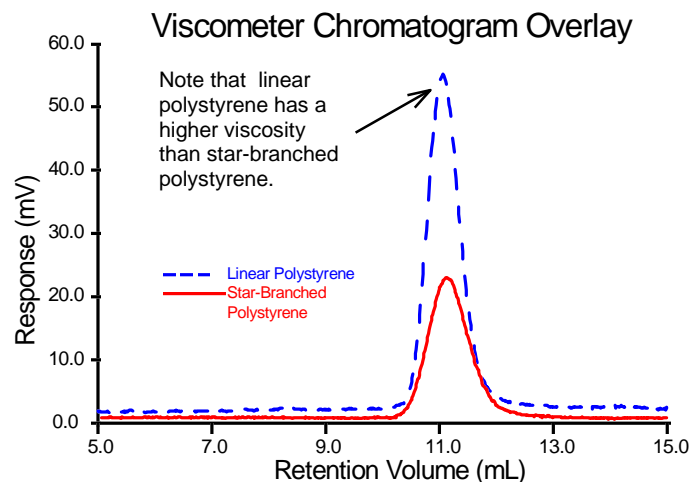
### Run Conditions

Solvent: THF  
Columns: 2 -10 $\mu$  Linear Mixed Bed  
Concentration: 0.8 mg/mL  
Injection Volume: 50  $\mu$ L  
Flow Rate: 1 mL/min

The following table reveals that the ratio of intrinsic viscosity of linear to branched polystyrene is a direct function of the number of arms.



Linear polystyrene and star-branched polystyrene cannot be distinguished from elution volume alone. By coupling the chromatography system with a viscometer, both molecular weight and number of branches can be determined directly.



Comparison of IV ratio as a Function of Number of Arms				
Mw	IV star	IV linear	IV ratio	Bn
340,000	0.805	1.162	0.693	4
100,000	0.318	0.497	0.639	5
2,500,000	1.308	4.632	0.282	10

*IV Linear Equivalent Measured From Mark-Houwink Coefficients of Broad Linear Polystyrene 280,000.*

The relationship between viscosity of the regularly distributed star-branched polystyrene to the linear polystyrene can be expressed as follows:

$$g = (3f - 2) / f^2$$

where:  $g = IV_b / IV_l$  and  $f$  is the number of arms

