Conventional GPC Approach

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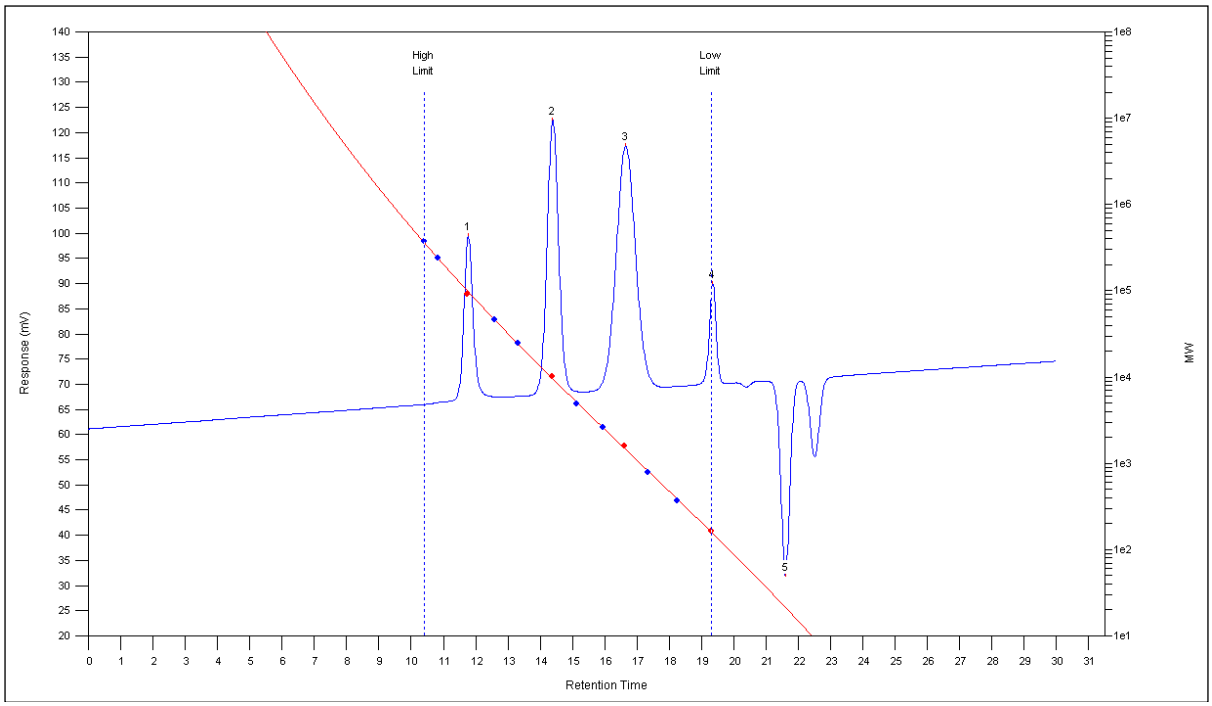
A conventional GPC approach only uses the response of a concentration detector, usually differential refractive index (DRI) but may be infrared (IR), ultraviolet (UV) or evaporative light scattering (ELS) to provide *comparative* molecular weight data.

Molecular weight data is obtained via a column calibration with log molecular weight versus elution volume or retention time - typically obtained using a series of narrow distribution calibrant polymers of known peak molecular weight (Mp). This approach only uses the response from a concentration detector and it is believed that it is the best approach if the calibrant polymers are of the *same chemical composition and structure (branching)* as the sample polymers, providing that there is no need to extrapolate the calibration. This approach still gives good comparative results even when the calibrant and sample polymers are different but the samples being compared must all be of the same chemical composition and structure for the comparison to be valid.



The log-linear relationship of the calibration and the fact that this is best defined by a third order relationship means that extrapolation of the calibration at high molecular weight may be questionable. Where possible, chromatography should be kept within the linear range of the fractionation columns selected.

For GPC systems operating with organic eluents it is typical to use either poly(styrene) or poly(methyl methacrylate) narrow distribution calibrant polymers and therefore the results are expressed as the *'PS'* or *'PMMA' equivalent molecular weight*. In some instances it may be practical to apply a mathematical correction, the *universal calibration* procedure, to allow for the differences between the sample and calibrant polymer types and expressing the results as for the sample polymer.

A conventional GPC service is available for all GPC systems at Smithers Rapra. Analysis is performed to in-house standard operating procedures and within our scope of accreditation to BS EN ISO/IEC 17025:2005 and listed on our UKAS schedule of accredited tests. Smithers Rapra use differential refractive index detection for all conventional GPC work – UV detection is available for some aspects.