9.2.6.3 Efficiency Terms

Peak Resolution ($R_{1/2}$)

The definition of this term is identical to that given in 9.2.3.10.:

$$R_{1/2} = \frac{V_{R1} - V_{R2}}{(w_{b1} + w_{b2})/2}$$

Here V_{R1} and V_{R2} represent the peaks corresponding to compounds with molecular masses M_1 and M_2 respectively; by definition $M_2 > M_1$. In exclusion chromatography, larger molecules are eluted first, therefore, $V_{R1} > V_{R2}$.

Because of the addition of a new term, the *Specific Resolution*, the symbol $R_{1/2}$ is suggested for peak resolution in exclusion chromatography.

Specific Resolution (R_{sp})

Peak resolution also considering the molecular masses of the two test compounds:

$$R_{sp} = \frac{V_{R1} - V_{R2}}{(w_{b1} + w_{b2})/2} \frac{1}{\log(M_2 / M_1)}$$

The test compounds used for the determination of the specific resolution should have a narrow molecular-mass distribution (the ratio of the mass-average and number-average molecular masses should be equal to or less than about 1.1) and differ by a factor of about 10 in their molecular masses.

Note: In some nomenclatures, the symbol R_s is used for the specific resolution. Due to the possibility of confusing it with the general resolution term (see *Peak Resolution*), the symbol R_{sp} is suggested here.

Plate Number and Plate Height (*N, H*)

The definitions of these terms are identical to those given in 9.2.3.10.

Effective Plate Number and Effective Plate Height (N_{eff}, H_{eff})

The definitions of these terms are identical to those given in 9.2.3.10., except that the *Retention Volume of an Unretained Compound* (V_o) is used in the calculations:

$$N_{\text{eff}} = 16\left[\frac{V_{\text{R}} - V_{\text{o}}}{w_{\text{b}}}\right]^2 = 5.545\left[\frac{(V_{\text{R}} - V_{\text{o}})}{w_{\text{h}}}\right]^2$$

$$N_{\text{eff}} = 16\left[\frac{t_{\text{R}} - t_o}{w_{\text{b}}}\right]^2 = 5.545\left[\frac{(t_{\text{R}} - t_{\text{o}})}{w_{\text{h}}}\right]^2$$

$$H_{\text{eff}} = L/N_{\text{eff}}$$

Reduced Plate Height (*h*)

The definition of this term is identical to that given in 9.2.3.10.